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READING:
ITS NATURE *and* DEVELOPMENT

By

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with the co-operation of

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PREFACE

In June, 1915, the General Education Board made an appropriation to the Department of Education of the University of Chicago with which to prosecute laboratory studies in reading and writing. This subsidy was given after a careful canvass of the work commenced by members of the Department.

Prior to 1915 scattered studies in these subjects had been completed by candidates for advanced degrees and by members of the Department. The usual difficulties had impeded these investigations, conspicuous among which were lack of apparatus and lack of time to devote to the task. The gift of the General Education Board removed entirely the material obstacles. Apparatus of a most elaborate type was made possible and was at once set up. The gift of the Board also went far toward supplying time and energy. A part of the fund was devoted to the employment of research and clerical assistants.

The outcome of two years of experimental work on reading is herewith presented. It is the product of the co-operative research of a number of workers.

It is always a delicate task to attempt to assign personal credit for work of this type. In some measure the individuals who have cast their lots with this investigation will suffer because the final formulation is the work of a single editor. He is eager to make it very clear that the product is a co-operative output.

Dr. William S. Gray was well advanced in the formulation of his widely used reading tests before this work began. He has supplied the background, both by lending the results of his investigations and also by active contributions at many points. Pupils are classified throughout the report on the basis of his tests.

Dr. C. T. Gray worked during the academic year 1915–16 setting up the apparatus and performing experiments. It seemed best to recognize his independence in the part of the work which he did by publishing his results in advance of the general report. His work was accordingly published as Vol. I, No. 5, of the

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Supplementary Educational Monographs of the *School Review* and the *Elementary School Journal*. The subsidy of the General Education Board made possible his leave of absence from the University of Texas during the year 1915–16 and also the separate publication referred to above.

Miss Katherine McLaughlin was released by the subsidy of the General Education Board from a part of her duties as teacher in the University Elementary School to carry on the special work which she has reported fully in Chapter V of this report.

Mr. A. R. Gilliland is continuing the work he began in the fall of 1916. The results which he collected as the basis for Chapter III may therefore be expected to be enlarged in the future into an independent publication.

Dr. Clara Schmitt of the department of child-study of the public schools of the city of Chicago completed four years ago a study which included some work on the reading of defectives. This was published in Monograph Supplement No. 83 of the *Psychological Review*. Her new paper on "Developmental Alexia," from which liberal quotations are made in Chapter VI, was published independently in the issues of May and June, 1918, of the *Elementary School Journal*.

A number of other advanced students and teachers in the University made minor contributions to the investigation.

The editor of the report cannot refrain from expressing the hope that the study here presented will prove to be more than a mere contribution to the technique of dealing with a single branch of school work. With the earlier works of Dodge and Erdmann, of Dearborn and of Huey, this report exhibits the possibility of laboratory analysis of important school problems. Intensive laboratory work is slow and laborious as contrasted with the extensive statistical investigations which have contributed so largely to the advance of educational science in recent years. But minute analysis, even though laborious, must be made if school methods are to have a sound scientific foundation. The report is offered, therefore, as a plea for more intensive analysis of educational processes.

C. H. J.

CHICAGO, ILLINOIS

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CHAPTER I

RADICAL CHANGES IN THE TEACHING OF READING

In the second annual report which Horace Mann made to the Board of Education of Massachusetts in 1838 he discussed the methods and results of the teaching of reading in the elementary schools of that state. Anyone examining this report or studying the conditions to which it refers will recognize that one of the most far-reaching educational reforms of the last two generations is that which began in the days of Horace Mann and has completely changed the methods of teaching reading.

WEBSTER'S "SPELLER"

When Horace Mann wrote his report the *Speller* prepared by Noah Webster was the chief textbook in all schools. This book is said to have been sold to the number of eighty millions during the century following 1783, when it was written. It opens with a few pages on the letters and sounds used in English spelling. The first exercise introduces the pupil to the combinations of the first five consonants with the vowels. The pupil learns meaningful and meaningless combinations together as follows:

ba, be, bi, bo, bu, by
ca, ce, ci, co, cu, cy
da, de, di, do, etc.

He then studies phrases made up of words of two letters, such as go on, go in, go up, an ox, by me, etc. After the two-letter combinations have been learned the pupil is given combinations of three, four, and five letters, the spelling being relieved from time to time by such reading exercises as the following: (Lesson 86) "Heavy clouds foretell a shower of rain. The rattan is a long slender reed that grows in Java. Good children will submit to the will of their parents. Let all your precepts be succinct and clear."

The arduous tasks in spelling set before the pupils of Horace Mann's day were evidently not wholly mastered, for he writes as follows:

I learn, also, that, with scarcely a single exception in the whole State, the scholars are kept in spelling-classes, or they spell daily from their reading-lessons, from the time of their earliest combination of letters, up to the time of their leaving school; and yet, if testimony, derived from a thousand sources, and absolutely uniform, can be relied on, there is a Babel-like diversity in the spelling of our language.[1]

HORACE MANN'S CRITICISM OF READING

If the results in spelling were not all that could be desired, certainly the reading suffered because of the excessive devotion to formal spelling. On this matter Horace Mann writes:

Entertaining views of the importance of this subject, of which the above is only the feeblest expression, I have devoted especial pains to learn, with some degree of numerical accuracy, how far the reading, in our schools, is an exercise of the mind in thinking and feeling, and how far it is a barren action of the organs of speech upon the atmosphere. My information is derived, principally, from the written statements of the school committees of the respective towns,—gentlemen who are certainly exempt from all temptation to disparage the schools they superintend. The result is, that more than eleven-twelfths of all the children in the reading-classes, in our schools, do not understand the meaning of the words they read; that they do not master the sense of the reading-lessons, and that the ideas and feelings intended by the author to be conveyed to, and excited in, the reader's mind, still rest in the author's intention, never having yet reached the place of their destination. And by this it is not meant that the scholars do not obtain such a full comprehension of the subject of the reading-lessons, in its various relations and bearings, as a scientific or erudite reader would do, but that they do not acquire a reasonable and practicable understanding of them. It would hardly seem that the combined efforts of all persons engaged could have accomplished more in defeating the true objects of reading.

How the cause of this deficiency is to be apportioned among the legal supervisors of the schools, parents, teachers or authors of school-books, it is impossible to say; but surely it is an evil, gratuitous, widely prevalent, and threatening the most alarming consequences. But it is not a remediless one. There is intelligence enough in this community to search out the cause, and wisdom enough to find and apply a remedy.[2]

[1] Horace Mann, "Second Annual Report of the Secretary of the Board of Education, 1838," in *Life and Works of Horace Mann* (Lee & Shepard, 1891), II, 508.

[2] *Ibid.*, pp. 531–32.

THE WORD METHOD

Finally, we may draw one further quotation from the report to show that the beginnings of reform were already appearing:

When a motive to learn exists, the first practical question respects the order in which letters and words are to be taught; i.e., whether letters, taken separately, as in the alphabet, shall be taught before words, or whether monosyllabic and familiar words shall be taught before letters. In those who learnt, and have since taught, in the former mode, and have never heard of any other, this suggestion may excite surprise. The mode of teaching words first, however, is not mere theory; nor is it new. It has now been practised for some time in the primary schools of the city of Boston,—in which there are four or five thousand children,—and it is found to succeed better than the old mode. In other places in this country, and in some parts of Europe, where education is successfully conducted, the practice of teaching words first, and letters subsequently, is now established. Having no personal experience, I shall venture no affirmation upon this point; but will only submit a few remarks for the consideration of those, who wish, before countenancing the plan, to examine the reasons on which it is founded.

During the first year of a child's life, he perceives, thinks, and acquires something of a store of ideas, without any reference to word or letters. After this, the wonderful faculty of language begins to develop itself. Children then utter words,—the names of objects around them,—as whole sounds, and without any conception of the letters of which those words are composed. In speaking the word "apple," for instance, young children think no more of the Roman letters which spell it, than, in eating the fruit, they think of the chemical ingredients—the oxygen, hydrogen, and carbon—which compose it. Hence, presenting them with the alphabet, is giving them what they never saw, heard, or thought of before. It is as new as algebra, and, to the eye, not very unlike it. But printed names of known things are the signs of sounds which their ears have been accustomed to hear, and their organs of speech to utter, and which may excite agreeable feelings and associations, by reminding them of the objects named. When put to learning the letters of the alphabet first, the child has no acquaintance with them, either with the eye, the ear, the tongue, or the mind; but if put to learning familiar words first, he already knows them by the ear, the tongue, and the mind, while his eye only is unacquainted with them. He is thus introduced to a stranger through the medium of old acquaintances. It can hardly be doubted, therefore, that a child would learn to name any twenty-six familiar words much sooner than the twenty-six unknown, unheard, and unthought-of letters of the alphabet.[1]

Teaching reading by the so-called word method had, indeed, been suggested long before the time of Horace Mann. Comenius

[1] *Ibid.*, pp. 519–21.

suggested it in the *Orbis Pictus* in 1657. But the A-B-C method, which was the method of the Greek and Roman schools[1] and later of the mediaeval schools, survived and was well-nigh universal even in the middle of the last century.

REFORMS SINCE THE DAYS OF HORACE MANN

Since Horace Mann made his criticisms of the teaching of reading in Massachusetts a sweeping reform has been under way in this country. This reform gained momentum slowly. In 1850 McGuffey's *New Eclectic Readers* appeared. These famous readers treated the content of reading as more important than the mere spelling of words. They contained much material which was graded and so selected as to meet the immature tastes of children. Indeed, it is said that McGuffey proceeded in strictly empirical fashion by calling in the children of his neighborhood and submitting to their tastes the passages he had collected. Such passages as appealed to those of first-reader age went into the first reader, and so on. The McGuffey readers, in spite of their emphasis on content, did not break completely with tradition; they contained spelling exercises. We recognize in the spelling exercises the influence of Webster's *Spelling Book*. But there is such a change in form and spirit of instruction that it is evident that schools tried to respond to Horace Mann's demand for meaningful exercises suited to children's tastes and capacities.

After the McGuffey readers came more readers, bolder in their omissions of spelling exercises and broader in the variety of their content, until finally the volume of this kind of publication has become so great that one can hardly keep up with the readers which appear each year. The innovations in method know no limits. There are new methods which lay stress on silent reading; new methods which base their claims to recognition on the fact that they begin in the primer with verbs or action words instead of nouns; new methods which appeal to the child's interest in objects of the familiar environment, and so on.

[1] "A-B-C Books and Primers," *Barnard's American Journal of Education*, XII, 593–604.

Since 1880 there has also been a flood of books classified as supplementary readers. These books are intended to give pupils the opportunity and incentive to read broadly outside the regular class exercise.

SCHOOL EXPERIMENTS IN READING

Parallel with the new reading books a wide variety of theories and an equally wide variety of school methods have developed. There are those who tell teachers that instruction in reading may be safely postponed until pupils are ten years of age. Others would allow pupils of kindergarten age to read. There are teachers who regard reading in the early years as a process of the most mechanical type. These teachers are interested in pauses and intonation and in the position in which the reader holds the book. There are other teachers who emphasize meaning and regard the mechanics of reading as altogether subordinate.

Such a variety of views and practices shows that we are in the experimental stage with regard to the teaching of reading. The danger is that we shall go on experimenting without making the kind of study of results which will tend to bring experimentation to a definite issue in scientifically defensible methods. A scientific study of reading should point out the way in which the experiences of the school and the investigations of the educational laboratory may be combined to supply certain principles of procedure which will surely improve instruction.

GENERAL OUTLINE OF THE PRESENT STUDY

The following chapters aim to carry out such a program of scientific study. The discussion will open with an analysis of some of the chief lines of practical experimentation in the school. The major problems requiring scientific study will thus be brought to the surface. Then will follow the exposition of the laboratory experiments and practical school devices used in the effort to solve these problems.

The later chapters will summarize the results of the whole study in a systematic view of the place of reading in the pupil's mental development and in the school curriculum.

CHAPTER II

A STUDY OF READING BOOKS

READING BOOKS REPRESENT SCHOOL PRACTICE

The systems of readers which have appeared since the abandonment of the A-B-C method furnish in very tangible form the material with which a scientific study of the teaching of reading may begin. In the first place each system is based on the experience of editors who have been successful enough in school work to seek wider applications of their methods through publication. Secondly, the practices of schools in all parts of the country are determined in very large measure by reading books. Finally, a number of the systems of readers are accompanied by manuals which explicitly set forth and defend theories in regard to the teaching of reading.

THE WORD METHOD

It was stated in the last chapter through quotations from Horace Mann that the word method was one of the earliest methods of teaching reading which was tried as a substitute for the A-B-C method. Children were taught words as wholes and learned to recognize them without analyzing them into letters. Experience soon brought out the fact that a child who is not taught to analyze the words in his reading usually makes rapid progress so long as he needs only a small vocabulary and is in contact with short, simple words. Such a pupil is commonly lost when he encounters long, complicated words or is called on to deal with a large list of words. Furthermore, the word method, when followed in its extreme form, leaves the pupil with little or no ability to spell. For this reason there was a reaction against the word method in its simple form after it had been tried for a time. Out of that reaction has grown an emphasis in many quarters on what is known as phonic analysis.

PHONIC METHODS

Phonic analysis differs from the A-B-C method in two essential respects. First, words are broken up by phonic analysis into their

sound elements instead of into their visual elements, that is, letters. Thus, as the matter is stated in one of these systems, "The word *lightning*, which the child learning by this method reads, *l ihgt n ing*, he finds no more difficult than the short word *left*, in which also he has to recognize and put together four separate sounds."[1]

Secondly, phonic methods are inductive in procedure. They begin by analyzing the word wholes with which the child is familiar in his oral speech; they arrive at the phonic elements by breaking up this larger original unit. The method in Webster's *Speller* is to build up words by adding together single letters. The phonic methods do not begin by building up new words out of elements but by discovering sound elements in words already known to the pupil. After analyzing familiar words the pupil acquires the power of attacking new words. Equipped with phonic elements discovered in earlier analyses, he can in his later experience unravel new combinations. In these later stages there is synthesis of phonic elements into new word wholes, but the new wholes are made up of sound units which were first secured by analysis.

The procedure in the Ward system, from which the quotation given above was borrowed, is described in the following statement:

> The Rational Method is a peculiar combination of the word and phonetic methods. It utilizes each for that part of the work to which it is especially adapted. The word method is used, first as principal, because of its value in developing a habit of reading thoughtfully, and afterward as auxiliary, to remedy the shortcomings of the phonetic method, and increase the stock of word phonograms. The phonetic method, which is introduced by easy stages during the ascendency of the word method, finally becomes the principal means of growth and progress. It imparts power, while it supplies the key which the word method is inadequate to give.[2]

The dual character of the training involved in giving a pupil word units which he can use and phonic elements which will help him in pronouncing words is clearly set forth in the following quotation from one of the newer phonic systems:

> Do not confuse the directions found on this and on the following pages, which relate entirely to the development of the phonetic power, with the

[1] E. G. Ward, *The Rational Method in Reading, Manual of Instruction* (Silver, Burdett & Co., 1907), p. 2.

[2] *Ibid.*, p. 1.

directions which relate solely to the development of the reading lessons by the word and sentence method. It should be clearly understood that at first there must be two distinct lines of teaching carried on side by side, namely: (1) the drill upon phonetic lists for the purpose of developing phonetic power in the child; (2) the reading of simple stories by the word and sentence method until the child's power in phonetics is far enough advanced to enable him to apply it in his reading lessons.[1]

It is of importance to note in this connection that there are many different phonic systems. When one begins to analyze words into their sound elements one finds several possible ways of carrying out this analysis. For example, it is the practice in many phonic systems to stress the last part of the word. Then such words as "bit," "sit," "knit," "fit," etc., belong to the same family. On the other hand, it is possible to build up lists in which the initial sound is the common element, as in "sit," "sin," "sing," etc. The A-B-C method is of necessity the same for every teacher because the A-B-C elements are capable of only one definite arrangement into words. Phonic elements are variable just in the degree in which complexes of sound are capable of different types of analysis.

SILENT READING AND ORAL READING

Not unrelated to phonics is the problem of teaching silent reading as contrasted with the teaching of oral reading. This contrast is of far-reaching importance because in all schools the greater emphasis is laid at the present time on oral instruction, whatever the system of reading books used. While instruction emphasizes oral reading the demand made on the pupils in the upper grades is very largely a demand for efficient silent reading. Pupils are expected to get their lessons in history and geography, and even in arithmetic, by reading silently. In spite of this they are offered little or no specific training in silent reading as distinguished from oral reading.

This matter has been touched on from time to time in introductions to readers. Nowhere has this been more vigorously expressed than in a recent manual which makes this problem and its solution the chief justification for the publication of a new series.

In our search for new roads to reading it is strange that we seldom think of the time that would be saved if pupils were trained to get the thought from

[1] James H. Fassett, *The Beacon Primer* (Ginn & Co., 1912), p. v.

a page at the first rapid, silent reading of it. If we can train a pupil so that at the first reading of a lesson he will do it intensively and grasp the thought expressed by the printed page, it will be unnecessary for him to read it again and again, repeating the printed text, word for word, until the thought is impressed on his mind.

By actual test it has been found that a few minutes of silent, intensive reading by a pupil trained under our system will suffice to master a lesson in history that under ordinary conditions would require half an hour of study.

This is our plea for presenting to teachers another system of reading. Much time is wasted in teaching reading, in reading, and in useless vague study of sentences and paragraphs. Train a pupil to read silently, rapidly, and intensively. He can then master a text.

Silent reading is a necessity and any system that trains pupils to grasp the thought at sight is developing in the child an incalculable power for future education. In view of this fact it seems strange that silent reading has not been emphasized and that no method for training in it has been heretofore presented. When we consider that all of our information from books is obtained through silent reading, and that oral reading is seldom employed for this purpose, we become convinced of the value of the former. If we reflect on the saving of time, we can readily perceive that *rapid* reading is also an essential.

Many of the systems now in use are good, having only this one great fault—they do not develop intelligent, rapid, silent readers. One reason for this is that the thought of the text in the first books is given to the pupils *by the teacher*. She tells the story, they dramatize it, then read it. This plan develops an intense interest. Just as great interest, however, can be gained by training the pupils to read, that they may dramatize later.[1]

Another quotation which bears on this matter is as follows:

Since reading is a complex operation consisting of word recognition, thought recognition, and thought expression, it is well to simplify it for beginners. This can readily be done by a process of elimination. We may, for example, eliminate the element of *thought recognition* by having the children read something with which they are already familiar. We may eliminate the element of *word recognition*, as in reading by position. Or we may eliminate the element of *thought expression*, and this is more important than either of the other ways. This is accomplished through silent reading, in which the children recognize the word and get the thought, without being put to the very considerable trouble of expressing the thought definitely with proper emphasis, inflection, and phrasing. The means employed are various, all being alike in that they provide a sure test of having grasped the thought. A typical case is the writing on the blackboard of *commands* to be read and obeyed by the children, the proof

[1] *Teachers Manual, The Method Used in the New Barnes Readers*, Primer and Book One (A. S. Barnes Co., 1916), p. 1.

of understanding being not words, but deeds. In the early stages silent reading should usually precede oral reading, at least until the children can read at sight. In more advanced work it takes the form of reading to get the gist, the point, the story.[1]

If the demand for silent reading set forth in these quotations is legitimate, there must be a careful consideration of the practices of schools which usually give much more time and attention to oral reading than to silent reading. Is oral reading justified at any level of school training? If so, how shall the limits of oral reading be determined? These and other practical questions depend for their answers on a careful, scientific study of school practices and their results.

THE DEMAND FOR MEANINGFUL READING MATTER

In the first chapter it was pointed out that one of the strong motives for abandoning the A-B-C method was the demand for meaningful reading matter for pupils. In recent times the demand for meaningful material has been expressed in various ways.

First and foremost is the conspicuous change in the character of the reading matter introduced into reading books, even the primers. The folk stories which children know and are able to tell are now commonly used at an early period. Descriptions of farm life and of the familiar environment are put into the first book. Instead of using merely descriptive words the primer is filled with commands to the children to run or hop or stand.

With this new type of reading matter have come discussions which draw the line sharply between the formal side of language teaching and the content side. Sometimes the discussions aim to show that formal training is not neglected even when emphasis is laid on the content. There is a note of apology at times in some of the statements about content as though the editor recognized that the demand for formal training is deep-seated in the thinking and practice of teachers and might lead to a rejection of his books. At other times the writers of "meaningful" texts make as much as they can of the contrast between their books and those

[1] Walter L. Hervey and Melvin Hix, *Daily Lesson Plans, Horace Mann Readers*, First Year (Longmans, Green & Co., 1912), pp. xxiii–xxiv.

of the earlier type. An example of the type of discussion here referred to is as follows:

With all this attention to content, what becomes of form, the mechanics of language? Are the uses of the marks of punctuation, of capitals, of sentences, paragraphs, and the rest neglected? Not at all; the learning of correct language forms is emphasized, but never as an end in itself, always as a means to an end. In the study of the bits of literature which the child understands and loves, he learns that certain forms are necessary to the expression of the content; he learns to appreciate the significance of forms. When he attempts to give expression to his own language material—at first taking a bit of literature as a model—he uses the conventional language forms with discriminating intelligence. Forms are taught only as the child needs them to use; but once taught, it is uniformly insisted that he shall always use every language form correctly, and that he shall know why he uses it. This conscious and discriminating use of language forms from the first soon grows into right habits.

Questions are used throughout the pupil's book, for the most part, not to test the pupil's knowledge but to arouse and direct his thought. This accounts for the character of those questions, sometimes quite frequent, that strongly suggest their answers. This type of question is often necessary to insure the trend of thought desired.[1]

Another example taken from a book published in 1910 is as follows:

For years the most progressive educators have been urging that only good literature should be used in school readers. Some authors of primers have thought it impossible to provide such material within the vocabulary that beginners can learn with ease. Others have used a little real literature with a large amount of unrelated and uninteresting material specially prepared for the sake of word repetition and phonic drill.

. . . . . .

After years of careful work we present some of these [simple folk] tales so as to utilize the child's love for the stories and make an easy road to reading. Avoiding the long struggle through forced interest, and the devious byways of artificial methods, we start the child at once into the realm of good, appropriate literature.[2]

Another similar statement is as follows:

In the past, a number of elaborate systems or "methods" have been worked out, and used in the schools with greater or less degrees of success.

[1] Frank E. Spaulding and Catherine T. Bryce, *Aldine Language Method* (Newson & Co., 1913), Part One, pp. 4–5.

[2] Harriette Taylor Treadwell and Margaret Free, *Reading-Literature*, The Primer (Row, Peterson & Co., 1910), Preface.

Practically all of these methods have been based upon the plan of analyzing our entire spoken language into its various phonetic elements, and then supplying drill on each of these elements by means of type words. The reading material of texts which follow these methods consists largely of disjointed sentences, built up out of phonetically selected words, as they are from day to day developed.

In recent years, however, experimental psychology has been throwing new light on the reading process. . . . .

In the light of the new psychology of reading, it would appear that the natural method of teaching the child to read provides him with material (stories) of such nature as will grip his interest and constantly develop his power for connected thinking, by means of incident and plot structure. Through the use of this *vital content*, the natural method develops the various phonetic elements of our language, one by one, as they are encountered in the story. A content of simple but vivid stories, expressed in a typical child vocabulary, will inevitably contain these phonetic elements, and will bring them to the child in the course of his reading needs quite as rapidly as he is capable of mastering them. Moreover, the type words selected from such material for drill purposes will come to him in interesting associations, as integral parts of real stories. Contrast the type words found in many primers and first readers,—doled out to the child in stiff, unnatural sentences, built up merely because some particular page is designed to exhibit, let us say the "in" family and therefore weaves an inane sentence to contain the word "pin." In the nature of things, reading-material constructed on this artificial basis is certain to lack continuity of thought. Indeed, pages of such primers and first readers may be read almost as effectively by beginning with the last sentence and reading up to the top of the page, as by reading in the usual way from top to bottom.[1]

THEORIES AS TO THE PSYCHOLOGICAL NATURE OF MEANING

It will be seen from these quotations that there is developing in teachers' manuals and in introductions to readers a body of theory with regard to what goes on in the child's mind when he reads. The theories are obviously of importance in that they determine the methods by which pupils are to be taught and also the subject-matter to be offered them. How far the discussion carries one into the psychology of reading can, perhaps, be made clear by considering one contrast brought out by a system of readers which emphasize action words.

[1] William H. Elson and Lura E. Runkel, *Teachers' Edition Elson Primary School Reader*, Book One (Scott, Foresman & Co., 1915), pp. 163–64.

The *Summers Readers* are worked out on the principle that the most natural word with which to begin teaching a child is a word which appeals to his active nature. The pupil wants to do something; therefore one should begin by writing on the board the word "run." When the pupil looks at that word and associates with it first the oral command and then the motor impulse he will have a motor interpretation of the word. This is better than a picture interpretation.

This principle is a departure from the time-honored belief that the interpretation of words depends on a train of pictures in the mind. The ordinary primer with its profuse illustrations is based either explicitly or implicitly on the theory that children need to have in mind vivid mental pictures of the things about which they read.

Current psychology has become so absorbed in the studies of behavior as contrasted with mental images that it has adopted the name "behaviorism" to describe its chief interest. The behavioristic psychology will give careful heed to the suggestion that the early training of children emphasize action.

In the later chapters we shall come back to the problem of meaning and to the methods of cultivating meaning in the most productive form.

PRACTICAL ADJUSTMENT OF MEANING AND FORMAL DRILL

It is clear in the light of current experience that the broad antithesis between emphasis on meaning or interpretation on the one side and emphasis on the formal elements of reading on the other side is a matter of increasing importance. The time has passed when teachers can be satisfied with any system which does not give heed to the intelligent interpretation of what is read.

There exists, on the other hand, a danger which should not be overlooked. It is the danger that enthusiasm for meaning will lead to neglect of the necessary training in the mechanics of reading. The older systems undoubtedly overemphasized drill in mechanics. The newer systems are sometimes neglectful of mechanics; they are sometimes scornful of all drill and of all detailed word analysis.

SCIENTIFIC STUDY BASED ON ANALYSIS OF READERS

Our study of reading books leaves us with a number of problems sufficiently important to justify actual experimenting in the schools. Scientific study may safely follow the suggestions of practical experimentation in seeking out its major problems.

SUMMARY

The word method, which first developed after the abandonment of the A-B-C method, was found inadequate without the support of some type of phonic analysis.

Phonic analysis has developed along various lines and has received varying degrees of emphasis. It deals with sound units, not letters, and inductively breaks up into elements words which are at first given as wholes.

Oral reading, which is the chief subject of instruction in the schools, is different from silent reading and is not adequate for complete preparation of pupils who must use books for purposes of study in the upper grades.

Of late great emphasis has been laid on meaningful reading matter. This has led to the development of theories as to the psychological nature of interpretation of printed matter. It has also raised pointedly the question whether formal drill in the mechanics of reading is necessary, and if so to what extent and at what period in the pupil's training.

CHAPTER III

EYE-MOVEMENTS OF ADULT READERS

If we find out what an experienced reader does when he is reading a printed page we shall be able to define the goal toward which school training must carry the pupil. A study of the eye-movements of adults is therefore a suitable introduction to a later analysis of the eye-movements of pupils of various grades.

The apparatus and method of this investigation have been described by C. T. Gray in an earlier monograph.[1] We may therefore omit the description here. One important refinement was introduced. On the same film on which the movements of the eye were photographed, a photograph was taken of a spot of light reflected from a bead fastened to a pair of spectacle rims worn by the reader. This gave a reference line on the film and rendered it possible to determine with greater precision the exact position of the eye.

The series of photographs to be reported in this chapter were made by A. R. Gilliland. The readers were university students in the graduate deparment. All readings were of a single paragraph taken at random from a novel. Plate I reproduces the passage in 11-point type in the exact form in which it was presented to the reader at each reading.

ANALYSIS OF THE RECORD OF EYE-MOVEMENTS IN SILENT READING

Plates II and III show the fixation pauses of Reader A during two silent readings of the passage. The lines have been separated in the vertical so as to make it easy to insert a number of figures and short vertical lines. The short verticals indicate in each case a point of fixation. In some cases there are oblique or broken lines; these indicate a slight shift of the eye during fixation. The serial

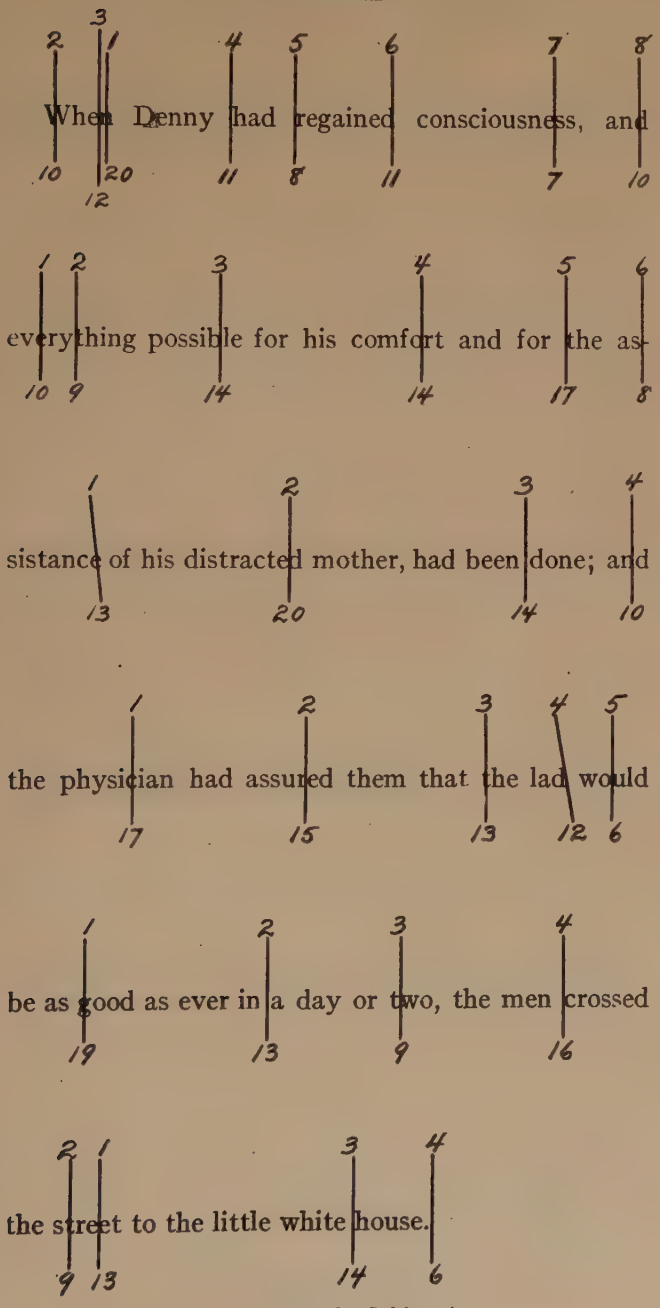
[1] C. T. Gray, *Types of Reading Ability as Exhibited through Tests and Laboratory Experiments*, Supplementary Educational Monographs of the *School Review* and the *Elementary School Journal*, Vol. I, No. 5 (1917), pp. 83–91.

PLATE I

When Denny had regained consciousness, and everything possible for his comfort and for the assistance of his distracted mother, had been done; and the physician had assured them that the lad would be as good as ever in a day or two, the men crossed the street to the little white house.

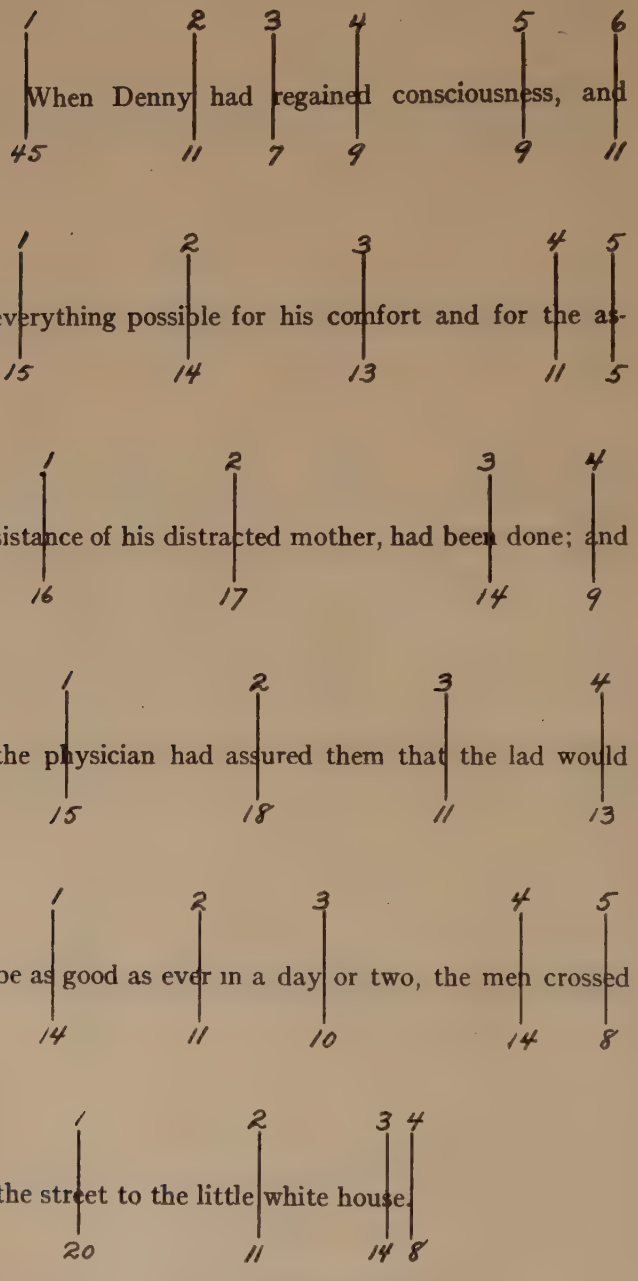
The passage read, showing the spacing between lines and the size of letters as used in the experiments.

PLATE II


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house.

Silent reading by Subject A

PLATE III


1 2 3 4 5 6
When Denny had regained consciousness, and
45 11 7 9 9 11
1 2 3 4 5
everything possible for his comfort and for the as-
15 14 13 11 5
1 2 3 4
sistance of his distracted mother, had been done; and
16 17 14 9
1 2 3 4
the physician had assured them that the lad would
15 18 11 13
1 2 3 4 5
be as good as ever in a day or two, the men crossed
14 11 10 14 8
1 2 3 4
the street to the little white house.
20 11 14 8

Silent reading by Subject A

numbers above the verticals indicate the order of the pauses; at the lower end of each vertical is a number indicating in fiftieths of a second the length of the fixation.

In the two cases presented in Plates II and III, A read the passage silently. The passage was perfectly familiar and yet was not memorized. The time consumed in reading the passage compared with A's general reading time shows that he read it carefully, that is, he consumed more time than he usually consumes in rapid reading but the same average time as in careful interpretation of simple material.

Line 1, Plate II, begins with a typical performance for the beginning of a line, especially the first line of a passage. A looks first at the last part of the first word. This does not satisfy him and he moves to the left and fixates the first letter. In general, records of the first line show an abnormal number of pauses because they usually include at the beginning such a series of movements as appear in this case.

The third fixation in line 1, Plate II, is adequate to carry the reader over the second word; this means that he saw "Denny" either from point 3 or from point 4.

Pauses 4 to 7 in the first line, Plate II, are short in duration and somewhat more numerous than the pauses in subsequent lines. It seems likely that the reading is not of normal type until after the first line. It is not safe to base generalizations on the results obtained in records of the first line, and in the tables this line will not be included in making up averages.

Pause 7, line 1, Plate II, falls in the part of this word which Subject A regularly fixates. Apparently he needs to see clearly the last syllable of this word in order to distinguish it from related words ending differently.

Lines 2 to 5 of this record show the typical eye-movements of silent reading for a trained adult. The fixations are fairly uniform in duration and they are so distributed as to make it clear that the reader recognizes phrases at each fixation. Striking examples are fixation 4, line 2; fixations 2 and 3, line 3; fixations 1 and 2, line 4; and all of the fixations in line 5.

ANALYSIS OF PLATE III, SHOWING SILENT READING

Plate III gives the same passage as Plate II, read silently on a different day by the same subject. This reading shows an abnormally long pause at the beginning of line 1 and short, frequent pauses in other parts of the line. The fixations in subsequent lines are uniform in duration and indicate a wide range of recognition. There are a number of very noticeable coincidences in the two plates. Note the points of fixation in the words "regained" and "consciousness" (line 1), in the phrase "for his comfort" (line 2, both plates), and throughout line 3. By way of contrast it may be noted that the two readings differ at the end of line 4 and at the beginning of lines 2 and 6. The fluency of a reader's perception differs at different times, but his habits of dealing with words are very much alike.

Certain further details are important. Short pauses at the ends of lines 2, 4, and 6 in Plate II, and lines 2, 3, 5, and 6 in Plate III, suggest that the pause immediately preceding the last virtually finishes the recognition of the line, but the eye moves to the extreme end to confirm and complete the process of recognition.

Long pauses often accompany large achievements of perception, as will be seen in Plate II, line 3, pause 2; line 4, first two pauses; line 5, pause 1; and in Plate III, line 2, first three pauses; lines 3 and 4, pauses 1 and 2.

GENERAL CHARACTERISTICS OF READER A'S RECORD

The length of the pauses and their distribution reveal much with regard to the inner processes of recognition on the part of the reader. Three general statements are justified: (1) Reader A exhibits certain recurring tendencies which seem characteristic of his methods of reading; (2) there are units of recognition which in some cases consist of words, in most cases of phrases or groups of words. These units are different according to the character of the words presented; (3) the beginning and end of a line present unique situations. At the beginning the process of recognition gets under way slowly in some cases while at the end the process of perception is complicated by the necessity of fitting the movements of the eye to the material presented.

ANALYSIS OF PLATES IV AND V, SHOWING ORAL READING

Plates IV and V show the results of the oral reading of the same passage by the same reader. It has long been known that the time required for oral reading is very different from that required for silent reading. Recently W. A. Schmidt[1] has shown for forty-five adults that the number and length of the pauses in silent reading and oral reading differ. The pauses in oral reading are more numerous in each line and their average length is greater.[2]

A superficial comparison of Plates IV and V with Plates II and III shows that the eye moves in an entirely different way in oral reading and in silent reading. The most conspicuous fact in the oral record is the tendency to fixate each word, while in silent reading the units of recognition are usually phrases. To be sure there are exceptions to the rule, but in general the fixations in oral reading fall on every word in the passage.

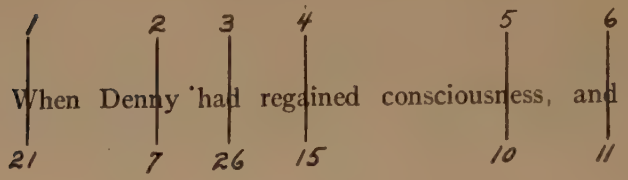
The explanation of this difference is to be sought in the fact that oral reading is controlled by speech units rather than divided into units of visual perception. The unit of speech is the word. In oral reading the eye moves from word to word, directing in this way the vocal apparatus as it utters each unit. In silent reading, on the other hand, the unit for the trained adult is wholly different; it is not a unit determined by the requirements of speech. It is rather a unit of recognition. If the mind can grasp a phrase, that becomes the unit governing fixation.

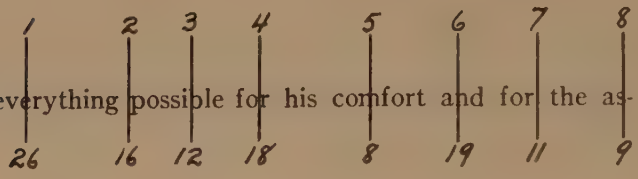
The difference in units in the two cases is related also to the difference in rate. The vocal apparatus requires more time to make its adjustments than does the eye. The slower pace in oral reading is not determined, therefore, by the inability of the reader to see and recognize words rapidly. The silent-reading records show that he can recognize whole phrases rapidly. In oral reading the eye lingers on each word, waiting for the vocal apparatus.

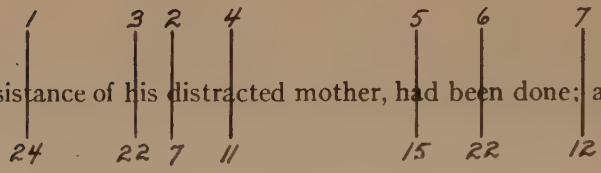
[1] W. A. Schmidt, *An Experimental Study in the Psychology of Reading*, Supplementary Educational Monographs of the *School Review* and the *Elementary School Journal*, Vol. I, No. 2 (1917), p. 39.

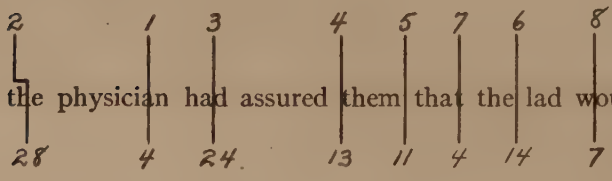
[2] Schmidt's table shows that the average number of pauses per line in silent reading for his forty-five readers was 6.5, while the average number of pauses in oral reading was 8.2 per line. The average duration of pauses in silent reading was 308.2 thousandths of a second; the average duration in oral reading was 380.8 thousandths.

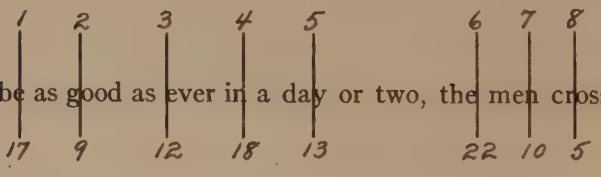
PLATE IV

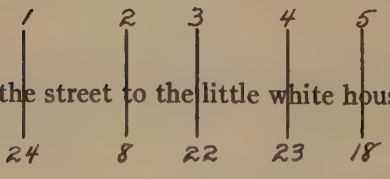






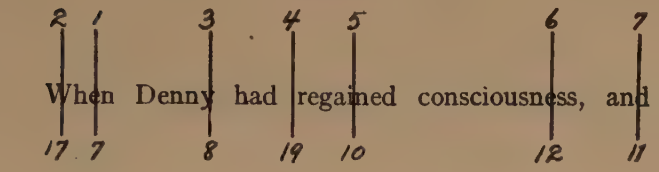


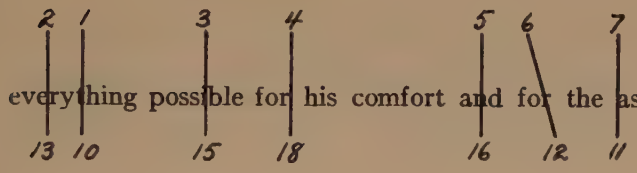


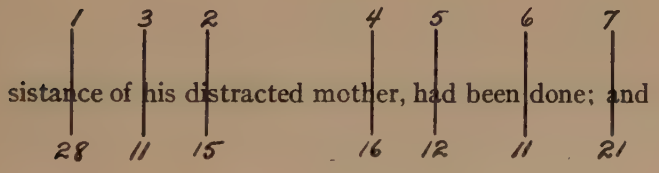


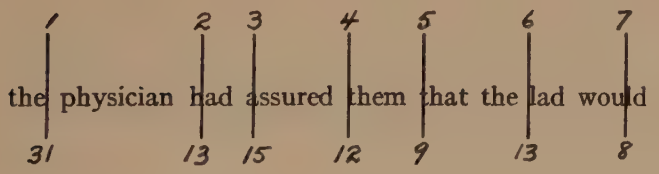
Oral reading by Subject A

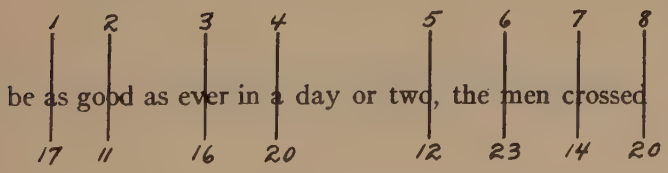
PLATE V

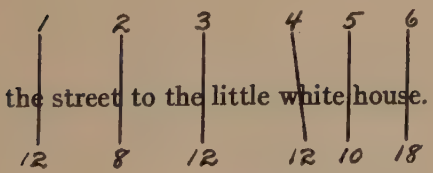












Oral reading by Subject A

The differences between oral reading and silent reading are impressively illustrated by contrasting lines 4 and 5 in the two sets of plates. These lines are made up of short words and phrases; when read silently (Plates II and III) they require few fixations. When the same lines are read aloud (Plates IV and V) the vocal apparatus must sound each word separately even though it is a short word; the eyes change their movements completely, accommodating themselves to the demands of speech.

The complications and long pauses at the beginning of lines are more conspicuous in oral reading than in silent reading, indicating a leisurely adjustment throughout. In oral reading the ends of the lines have short fixations in fewer cases than in silent reading (Plate IV, lines 4 and 5; Plate V, line 4). This is undoubtedly due to the fact that in most of the lines read orally the eyes linger on the end until articulation catches up with them. There is no motive, as in silent reading, for the eyes to move on as soon as possible.

Conspicuous cases, in which long pauses are not dictated by the demands of perception but are due to delay until the vocal apparatus can overtake perception, are seen in Plate IV, line 1, pause 3; line 2, pauses 2–4; line 3, pauses 3 and 6; Plate V, line 3, pause 7; and line 5, pause 6.

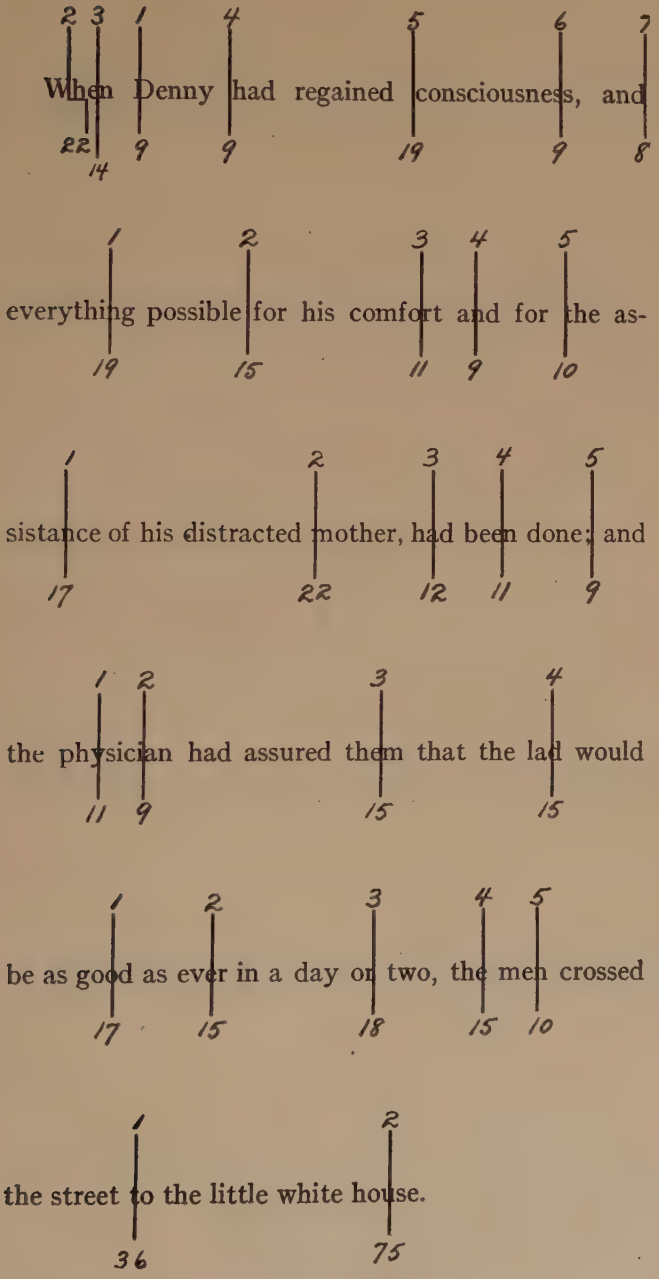
SUMMARY OF THE CONTRAST BETWEEN ORAL READING AND SILENT READING

A study of these cases makes it clear that oral reading and silent reading are very different processes. Silent reading consists of a series of pauses determined in number and length by the demands of recognition, while oral reading consists of a series of pauses dominated by articulation, recognition in this latter case being more than adequately provided for within the pauses required for pronunciation.

ANALYSIS OF SILENT RECORDS FROM SUBJECT B

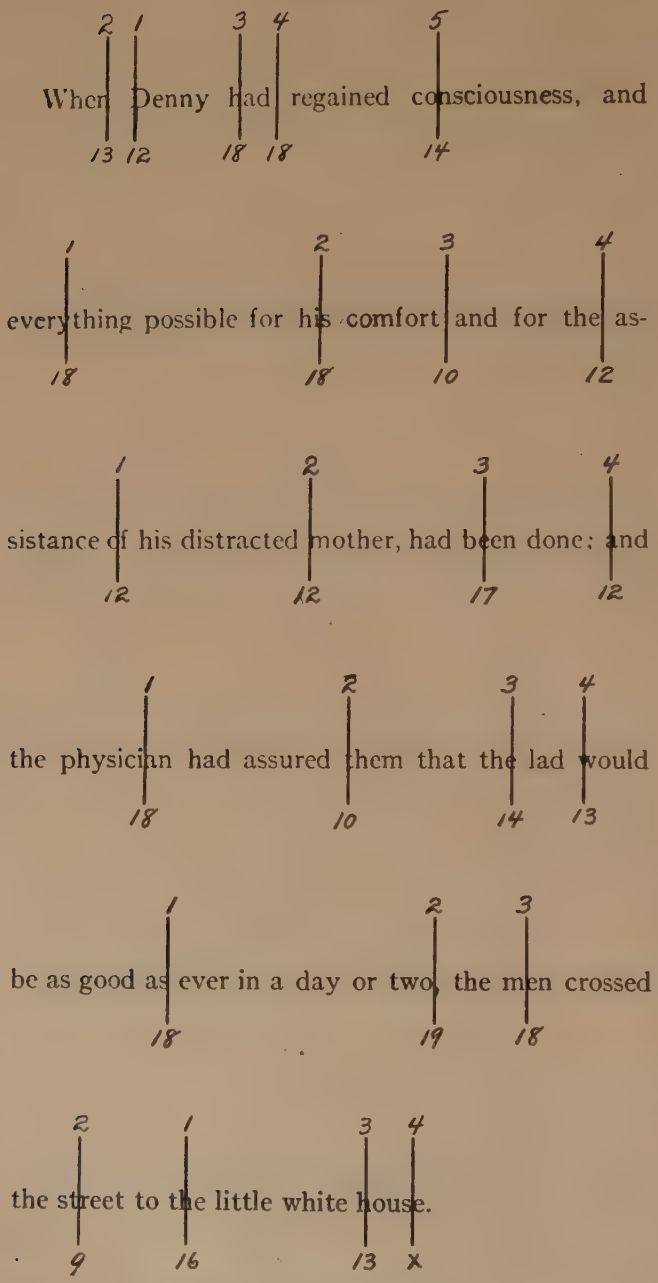
Plates VI and VII show two silent readings by Reader B. The record in Plate VII was taken immediately after that in Plate VI. The reading in Plate VII shows unmistakable signs of facilitation of recognition as compared with the reading in Plate VI. It is

PLATE VI


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house.

Silent reading by Subject B

PLATE VII


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done: and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house.

Silent reading by Subject B. × indicates that it was impossible to determine with precision the length of the pause.

easily demonstrated by experiments that one reading of a passage so prepares the reader that the second reading is more rapid. The facts shown in Plate VII give an important suggestion as to a method of teaching pupils to become rapid silent readers. Successive readings of the same passage develop habits of recognition of phrases.

It is not necessary to comment at length on the details of Plates VI and VII. As in the silent-reading records of individual A, so here phrases are recognized in many of the pauses. The units of recognition are longer in some instances than in the case of A. There is less consistency in the recurring fixations exhibited by B than there is in the readings of A in Plates II and III. The lack of consistency is to be explained in part by the improvements made in the second reading. Otherwise the typical facts discovered in the reading of A are repeated here.

ANALYSIS OF ORAL RECORDS

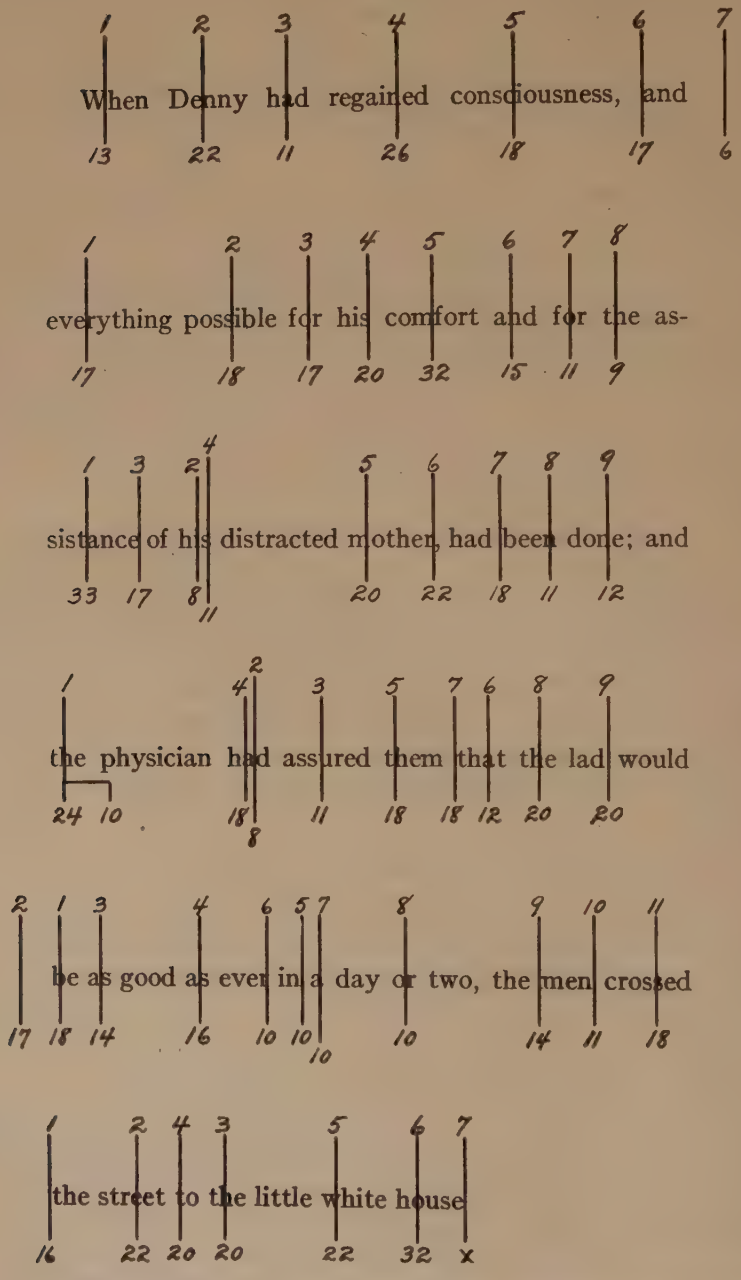
Plates VIII and IX show oral readings by Reader B and, as in the oral records of A shown in Plates IV and V, there are unmistakable signs that the eye-movements are accommodated to the rate of the vocal apparatus. The decided change in movements from those in Plates VI and VII confirms the conclusion, reached by examining A's record, that the mental attitude of the individual is very different in oral reading from that which he shows in silent reading.

SELECTION OF READER OF DIFFERENT TYPE

Readers A and B can be described in practically the same terms. Other adult readers have been photographed who have like general records. In the course of the photographing one subject was found who gave a characteristically different result. Four records from this subject, C, are given in Plates X–XIII. Plates X and XI show silent reading; Plates XII and XIII, oral.

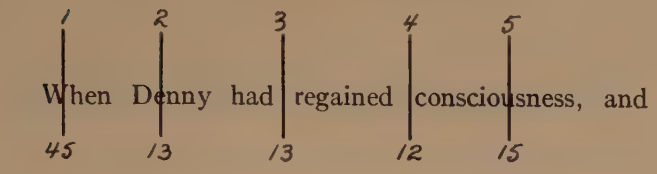
C is a slow reader. He reports that his instructor in public speaking criticized him as a word reader. He had difficulty in his law courses because they required a great deal of reading. An examination of C's records shows that the unit of recognition in his

PLATE VIII


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house

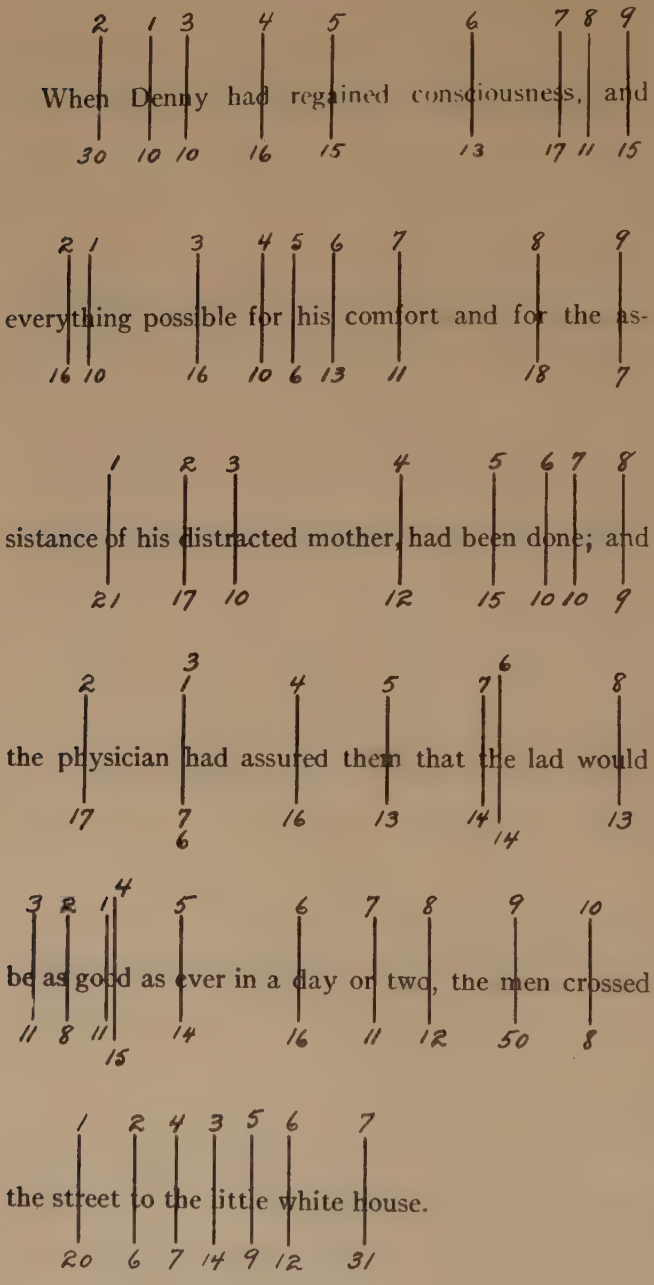
Oral reading by Subject B. × indicates that it was impossible to determine with precision the length of the pause.

PLATE IX


1 2 3 4 5
When Denny had regained consciousness, and
45 13 13 12 15
2 1 3 4 5 6 7 8
everything possible for his comfort and for the as-
20 8 14 15 6 13 10 9
4
1 3 2 5 6 7 8
sistance of his distracted mother, had been done and
18 14 11 11 11 6 15
10
1 2 3 4 5 6
the physician had assured them that the lad would
18 26 8 11 6 16
1 2 3 4 5 6 7
be as good as ever in a day or two, the men crossed
16 9 18 8 9 24 9
1 3 2 4 5
the street to the little white house.
14 11 11 9 26

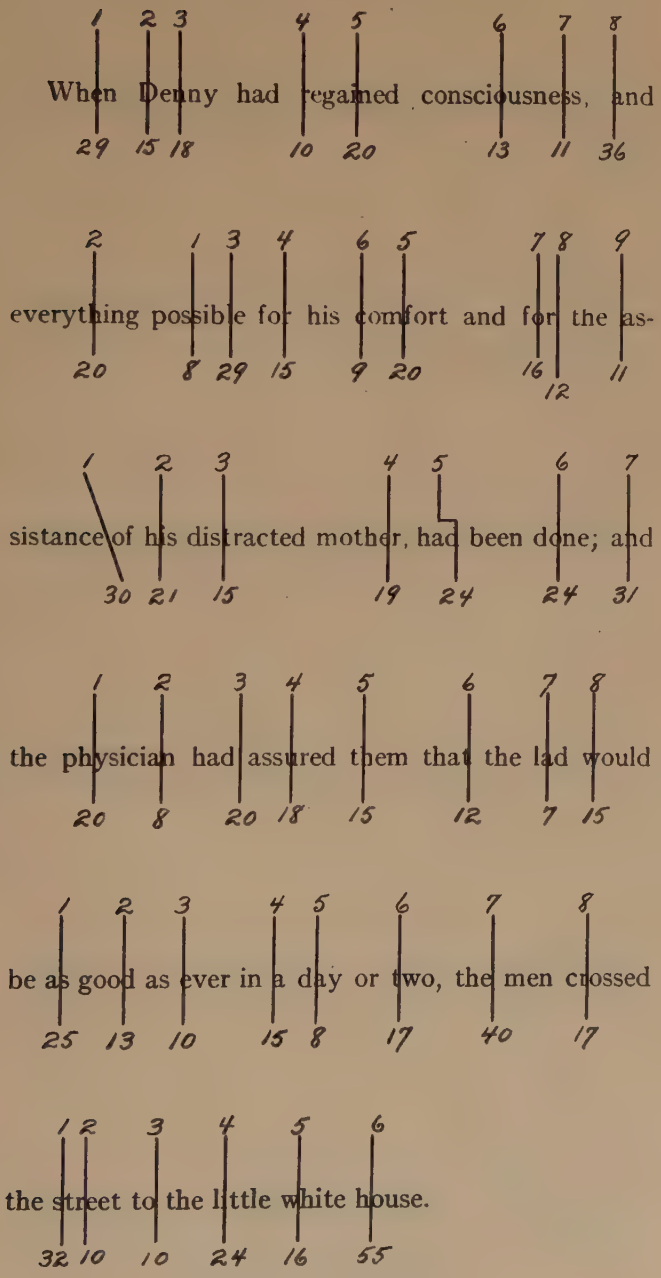
Oral reading by Subject B

PLATE X


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house.

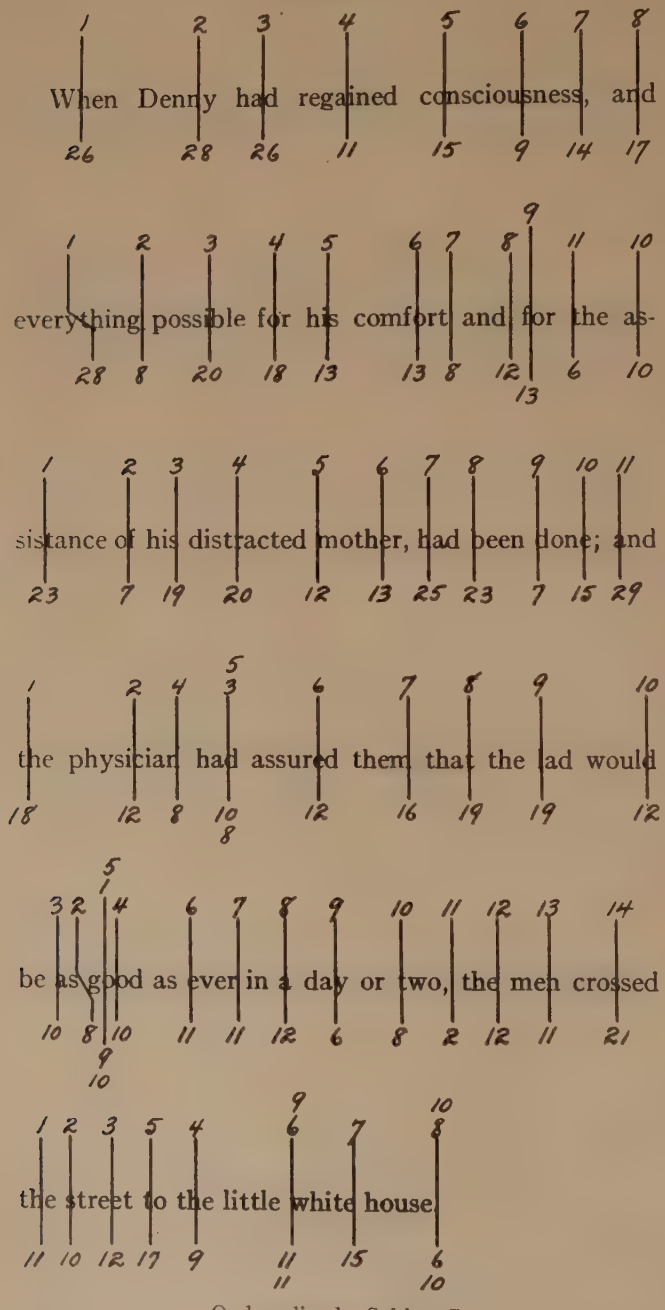
Silent reading by Subject C

PLATE XI


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house.

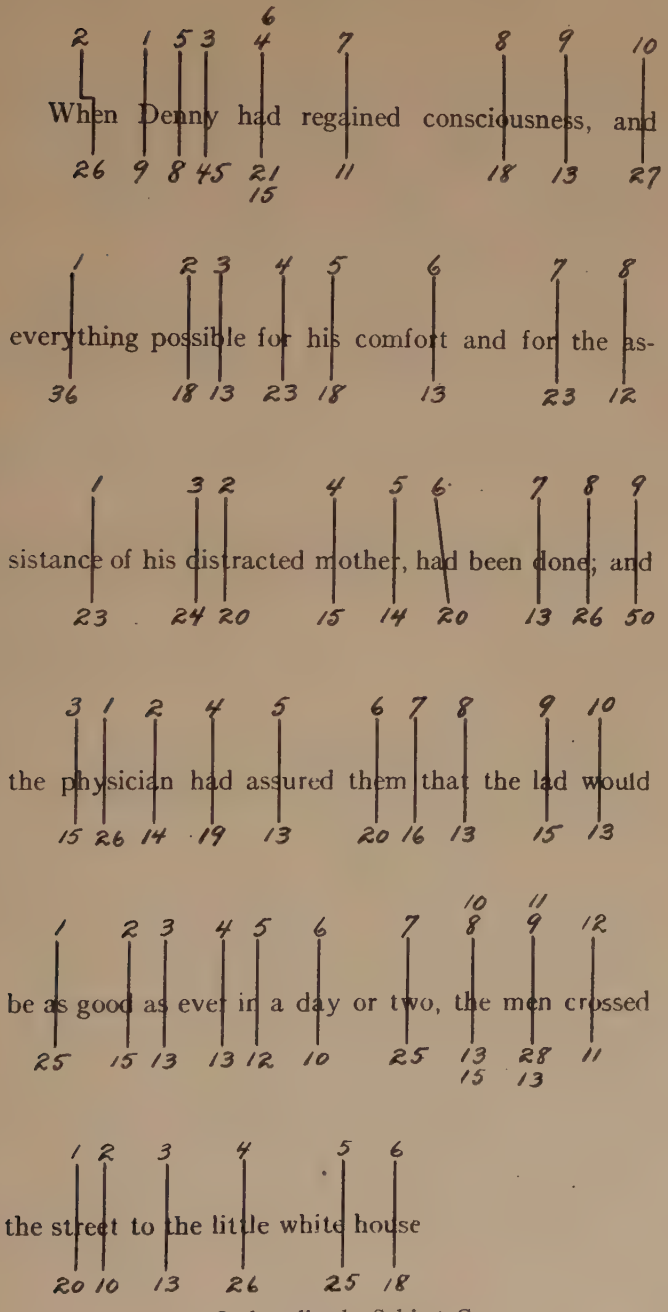
Silent reading by Subject C

PLATE XII


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house.

Oral reading by Subject C

PLATE XIII


When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and
the physician had assured them that the lad would
be as good as ever in a day or two, the men crossed
the street to the little white house

Oral reading by Subject C

case is very small. Even in silent reading there is a marked tendency to fixate each word. His oral record shows in many lines more than one pause in a word.

C's records when compared with those of Readers A and B furnish impressive evidence that somewhere in the education of this individual there must have been defective training in reading. It is easy to surmise that he probably was brought up in a school which emphasized oral reading, with the result that even when he reads silently he is dominated by oral-reading habits.

The next chapter will take up a number of cases of pupils who are poor readers. There is evident need for early diagnosis of such cases if slow readers of the type represented by C are to be avoided.

THE SPAN OF RECOGNITION FOR LARGE TYPE

For further light on the matter of the span of recognition certain variations were introduced in the size of the type. First the type was increased to twice the size and later reduced to half the size of the original. If the eye-movements are merely adjustments of the eyes to the sensory material offered to the reader's observation, surely so radical a change in size of type would result in marked differences in the number and length of fixations. The records in Plates XIV–XVI prove that the span of recognition for each of the Readers A, B, and C is very little affected by the increase in size of type. In the case of A there is an increase of one and a half fixations in the average number of pauses per line. For B there is no change in the number of pauses. For C the large type requires one or one and a half fixations less per line than did the medium-sized type. The average length of the pauses is different for A and B and the same for C. When all the variations are taken into account it can be said that there is only a very slight change in the number of words recognized at each fixation in spite of the doubling of the size of the type.

Plates XVII–XIX show oral-reading records for the three readers and should be compared with Plates IV, V, VIII, IX, XII, and XIII. The correspondence here is even closer than in the silent-reading records. Not only so, but each reader exhibits clearly the personal characteristics discovered in his earlier records.

SPAN OF RECOGNITION A MATTER OF TRAINING, NOT A MATTER OF SENSATION

The results of this comparison can be expressed in psychological terms by saying that the sensory conditions of reading are of less importance than the established habits of recognition. In other words, that which a reader recognizes at each fixation is largely a product of training. Equipped with mature powers of recognition an individual will behave in the same way even when there is a difference in sensory material.

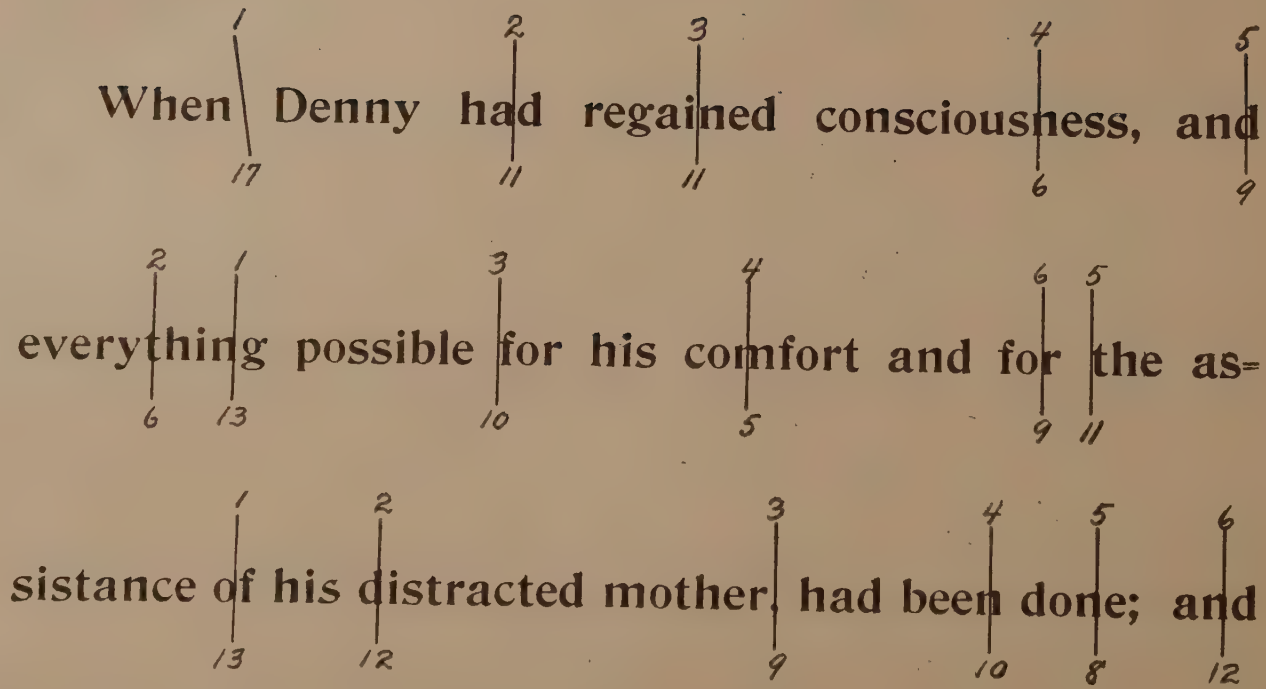
SENSORY MATERIAL BECOMES DETERMINING FACTOR

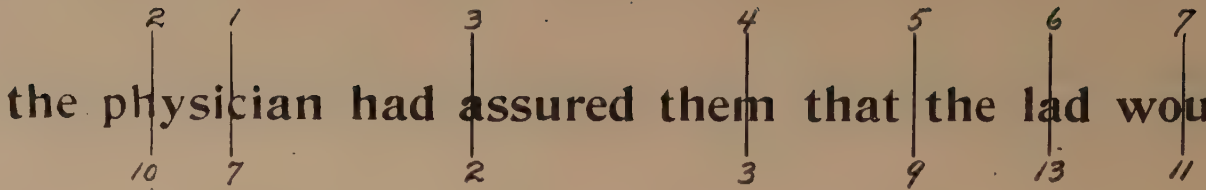
There comes a point, if type is steadily increased in size, when the words are spread out so much that recognition is difficult because of the character of the sensory material. An extreme case is that of an illuminated sign where the letters are so large that even familiar words must be spelled out.

SPAN OF RECOGNITION FOR SMALL TYPE

Plates XX–XXIII show the way in which readers A and C deal with small type. In these records the characteristic personal traits of the readers appear once more, as do also the typical differences between oral reading and silent reading. As compared with the records made with medium-sized type the disturbance of the span of recognition is somewhat more marked with small type than it was with 22-point type. The number of pauses is less and the average length of the pauses in silent reading is slightly greater. The effect on the fixations is, however, in this case by no means proportional to the change in the size of type. Such change as there is can be explained as due to the fact that more words fall within the area of clear vision than is the case with 11-point type. Furthermore, eye-movements are somewhat more difficult because of the small size of the line to be followed. The tendency is therefore to reduce the number of fixations and enlarge the number of words recognized at a single fixation. The impressive fact is that the deviation from the record with 11-point type is small. Instead of there being half as many fixations for type half the size, the character of the eye-movements undergoes only slight change.

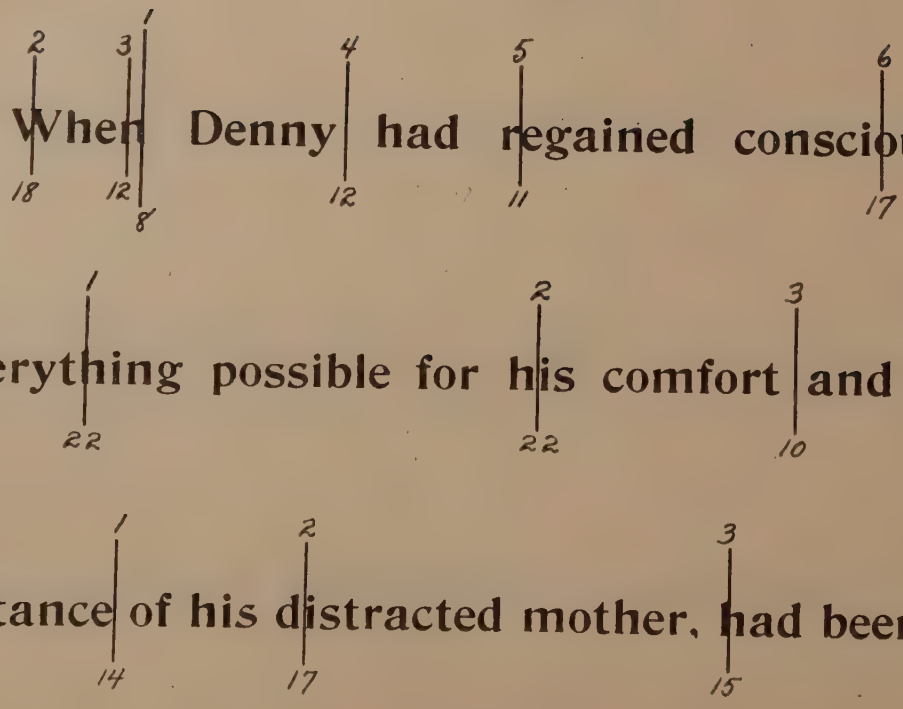
PLATE XIV

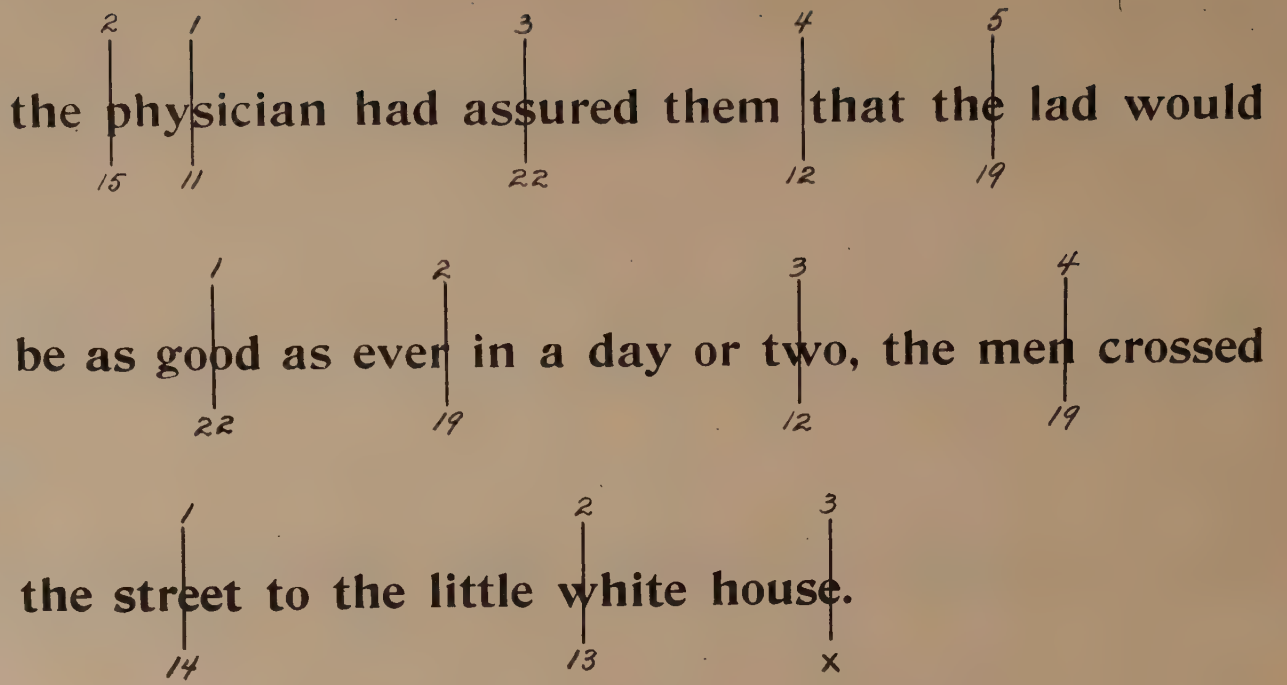

When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and


2 1 3 4 5 6 7
the physician had assured them that the lad would
10 7 2 3 9 13 11
2 1 3 4 5 6
be as good as ever in a day or two, the men crossed
10 11 9 9 12 11
2 1 3 4 5 6
the street to the little white house.
11 10 11 7 13 8

Silent reading by Subject A

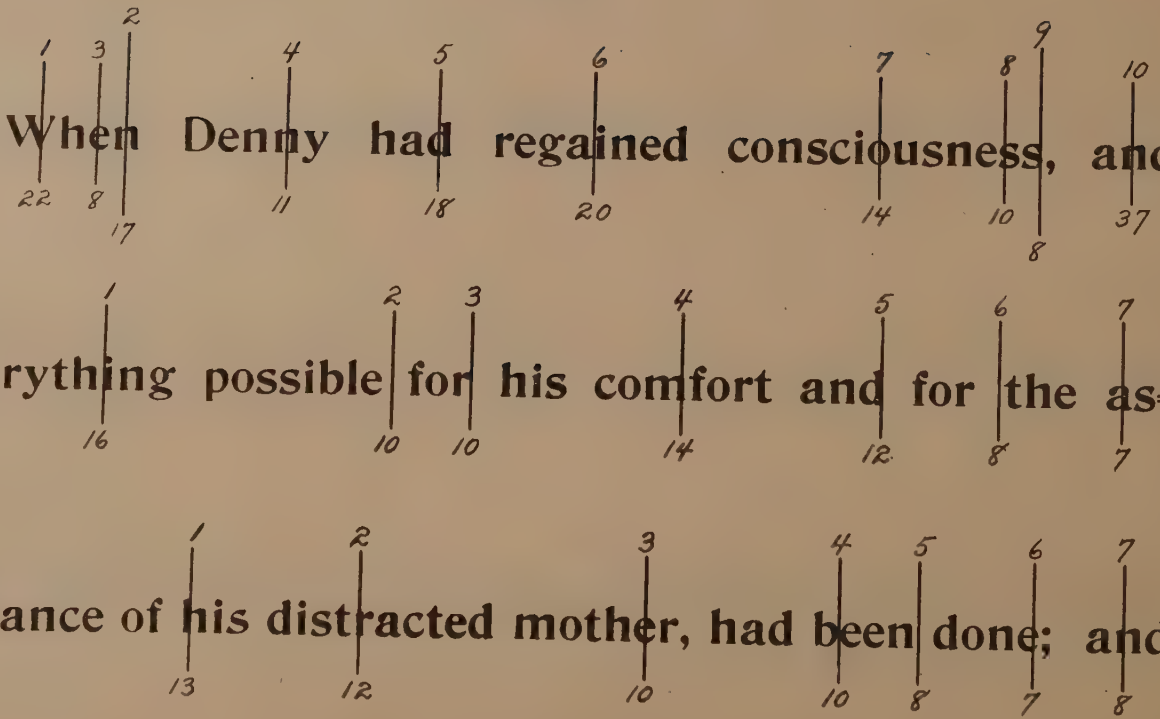
PLATE XV

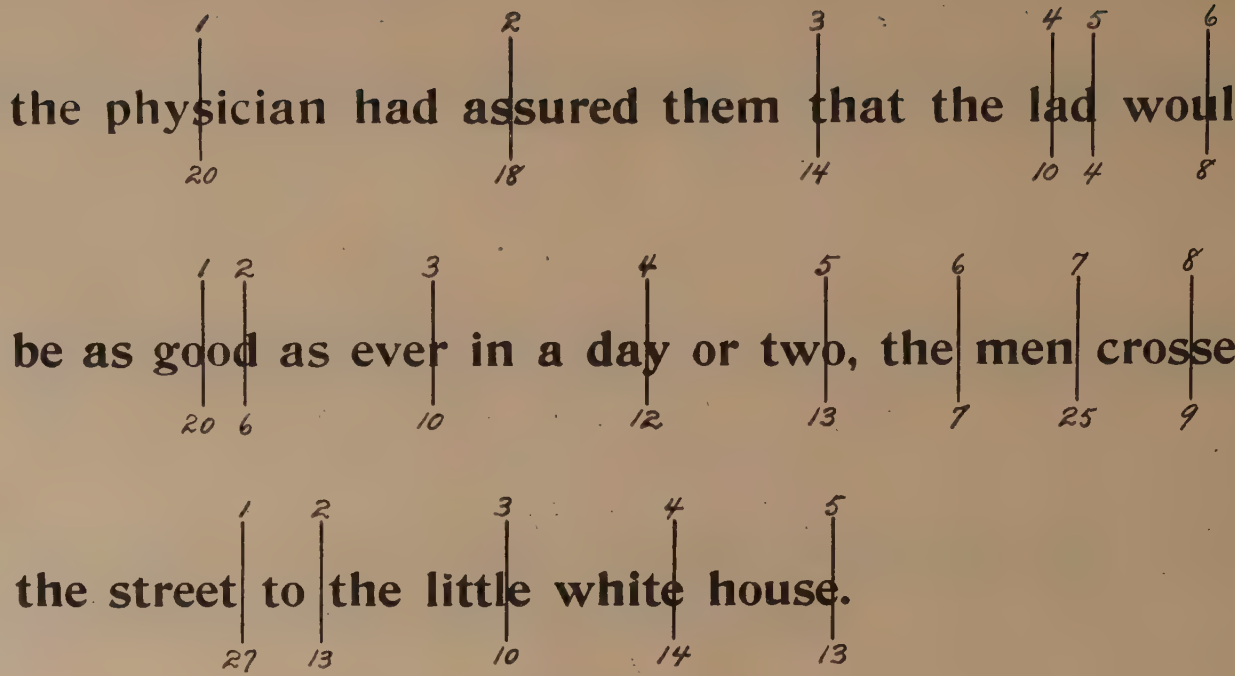

When Denny had regained consciousness, and
everything possible for his comfort and for the as-
sistance of his distracted mother, had been done; and


2 1 3 4 5
the physician had assured them that the lad would
15 11 22 12 19
1 2 3 4
be as good as ever in a day or two, the men crossed
22 19 12 19
1 2 3
the street to the little white house.
14 13 X

Silent reading by Subject B. × indicates that it was impossible to determine with precision the length of the pause

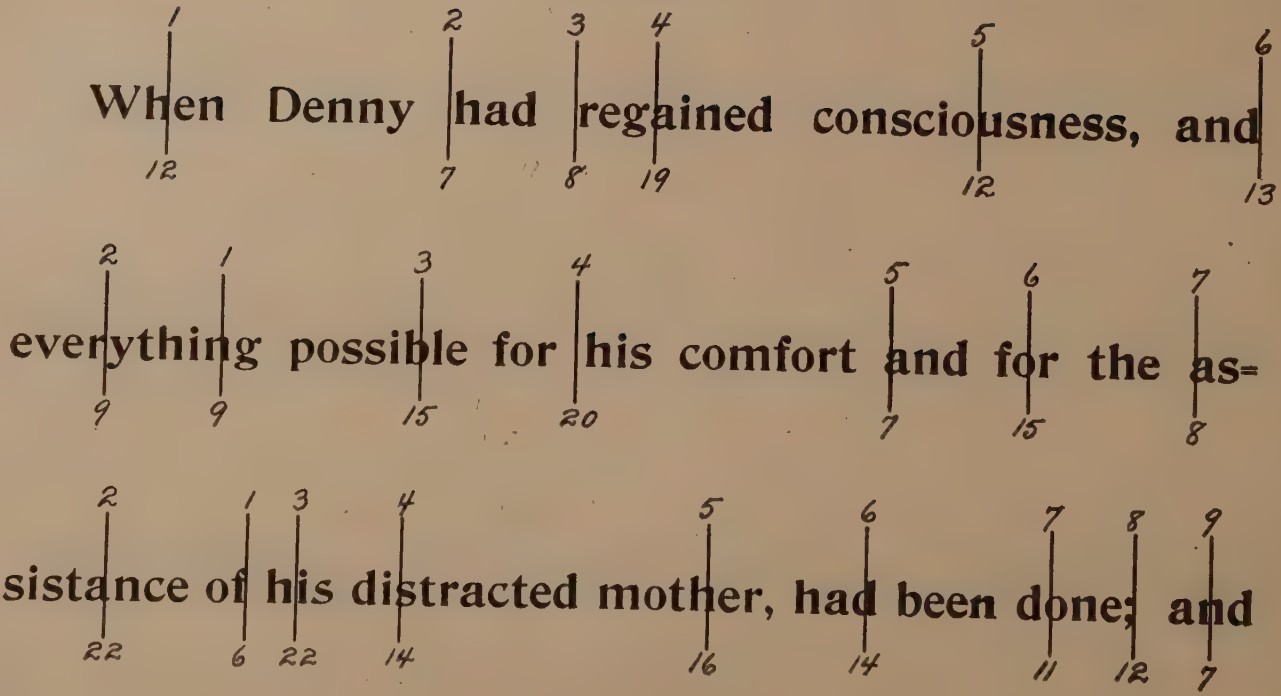
PLATE XVI

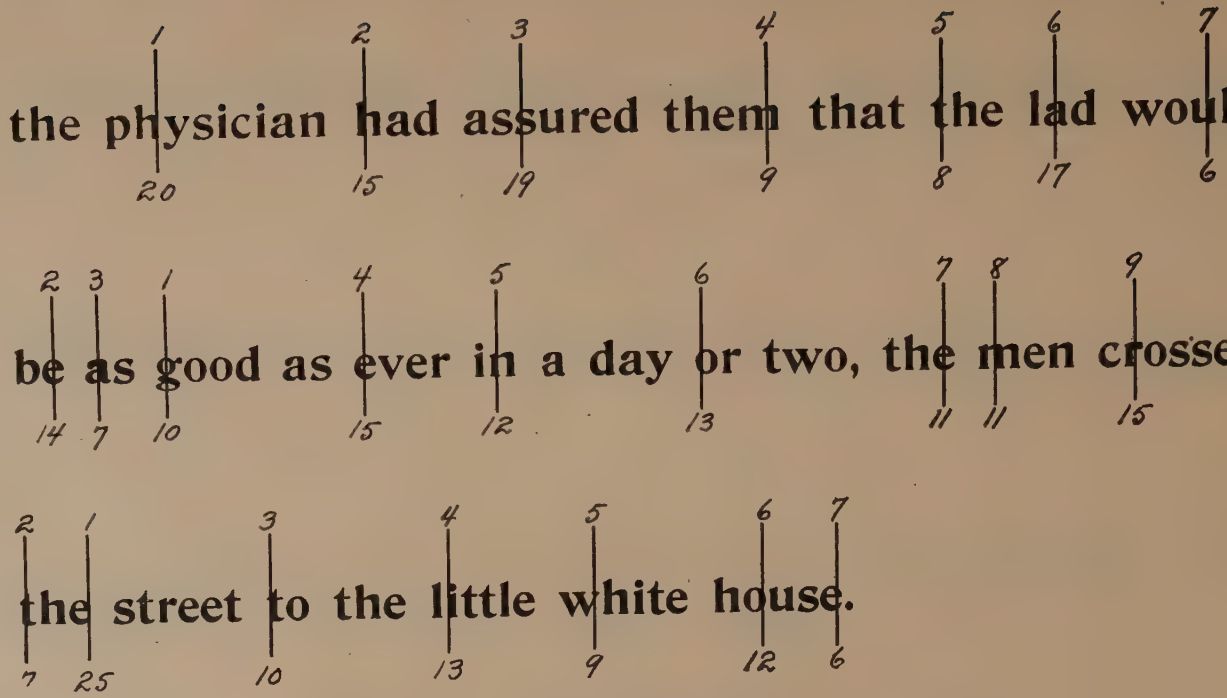

When Denny had regained consciousness, and
everything possible for his comfort and for the as=
sistance of his distracted mother, had been done; and


1 2 3 4 5 6
the physician had assured them that the lad would
20 18 14 10 4 8
1 2 3 4 5 6 7 8
be as good as ever in a day or two, the men crossed
20 6 10 12 13 7 25 9
1 2 3 4 5
the street to the little white house.
27 13 10 14 13

Silent reading by Subject C

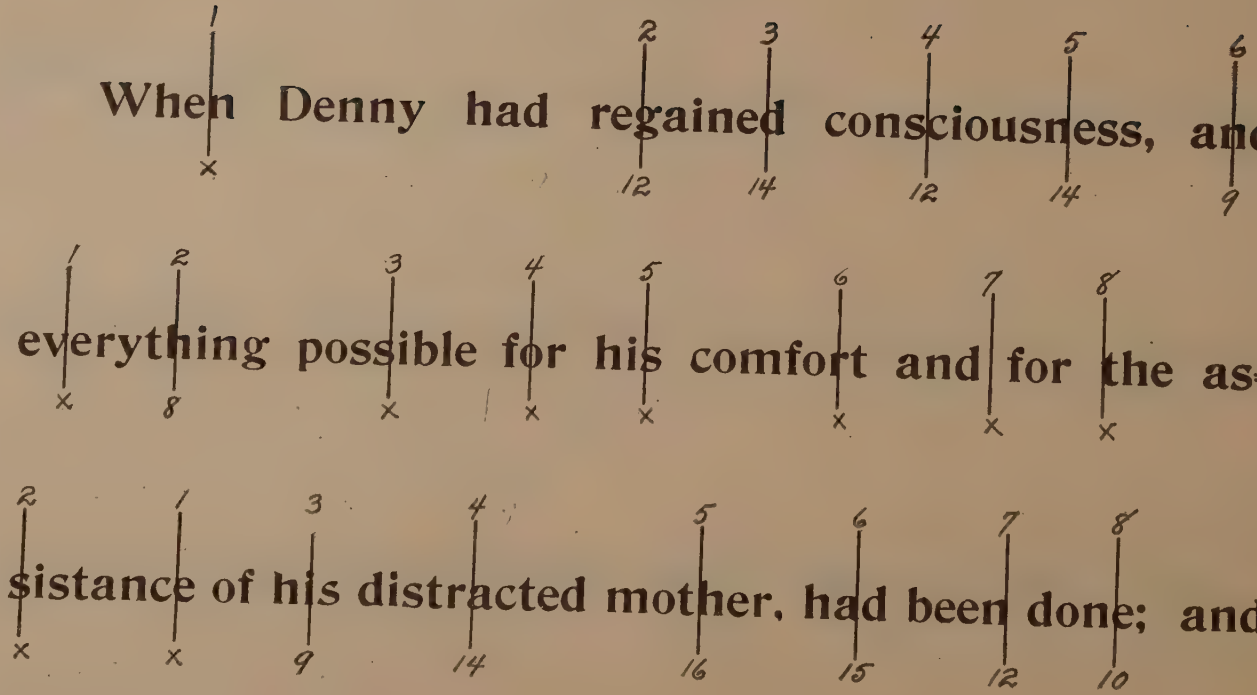
PLATE XVII

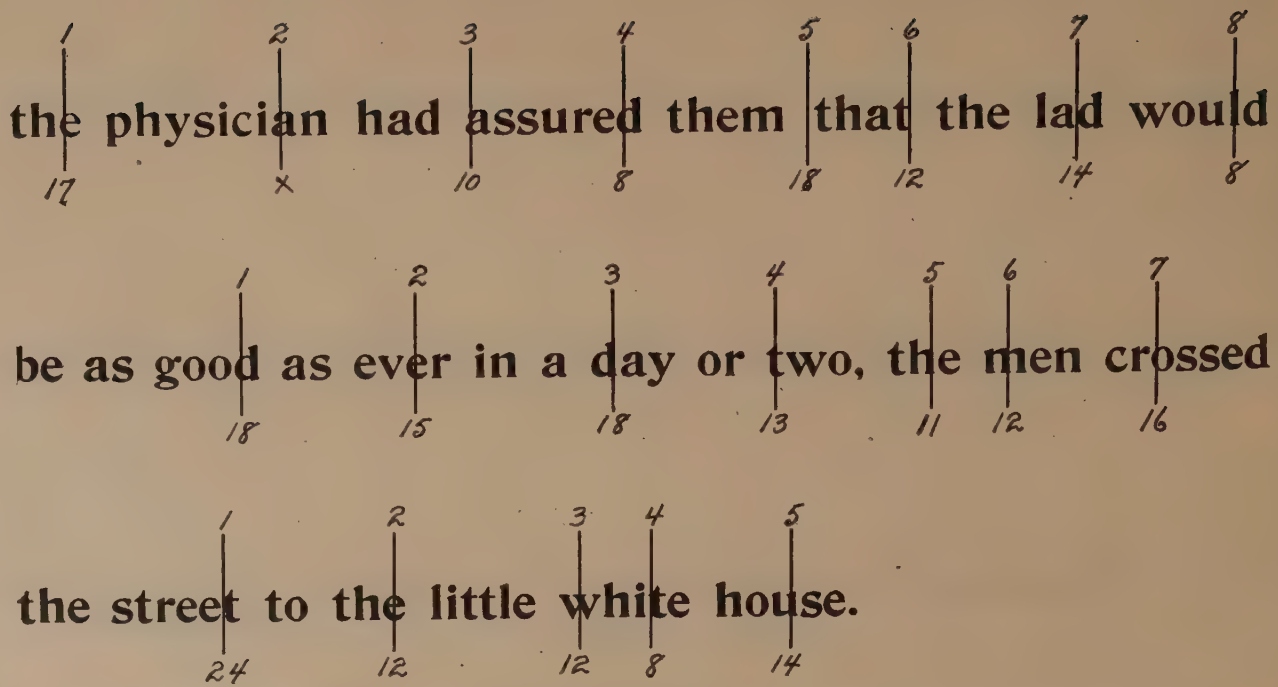

When Denny had regained consciousness, and
everything possible for his comfort and for the as=
sistance of his distracted mother, had been done; and


1 2 3 4 5 6 7
the physician had assured them that the lad would
20 15 19 9 8 17 6
2 3 1 4 5 6 7 8 9
be as good as ever in a day or two, the men crossed
14 7 10 15 12 13 11 11 15
2 1 3 4 5 6 7
the street to the little white house.
7 25 10 13 9 12 6

Oral reading by Subject A

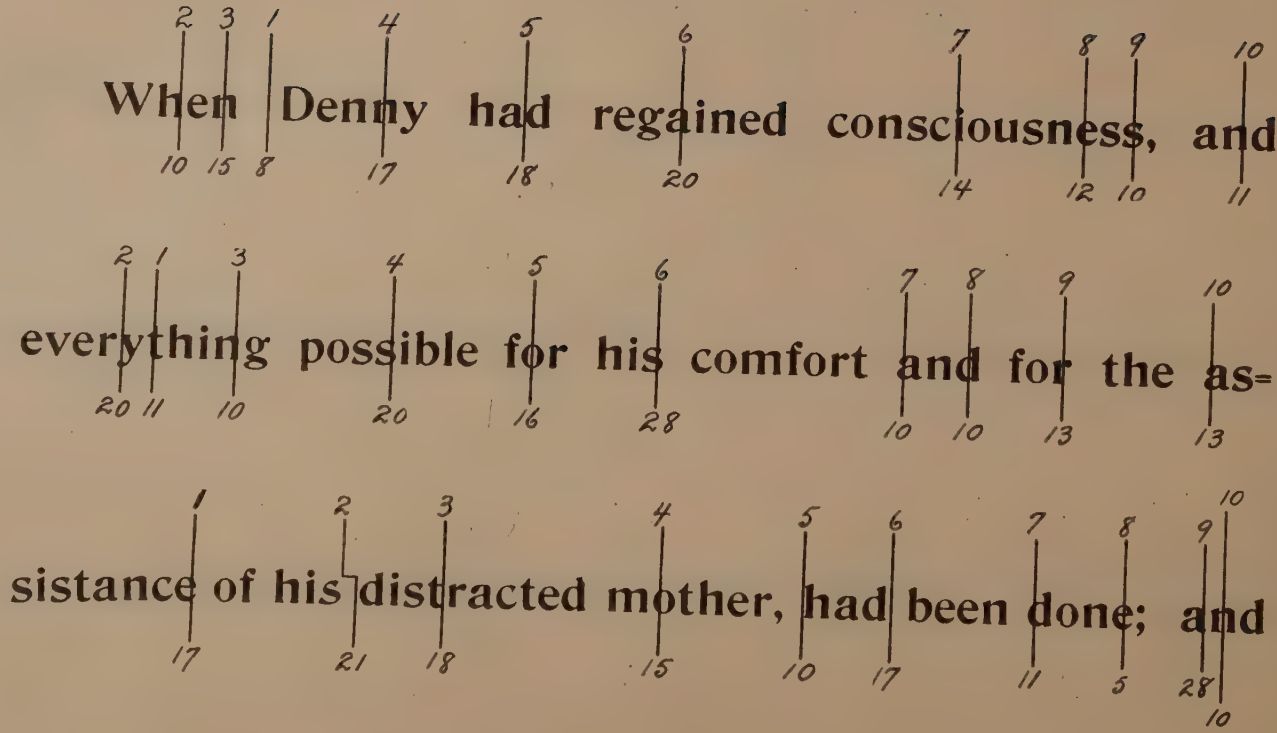
PLATE XVIII

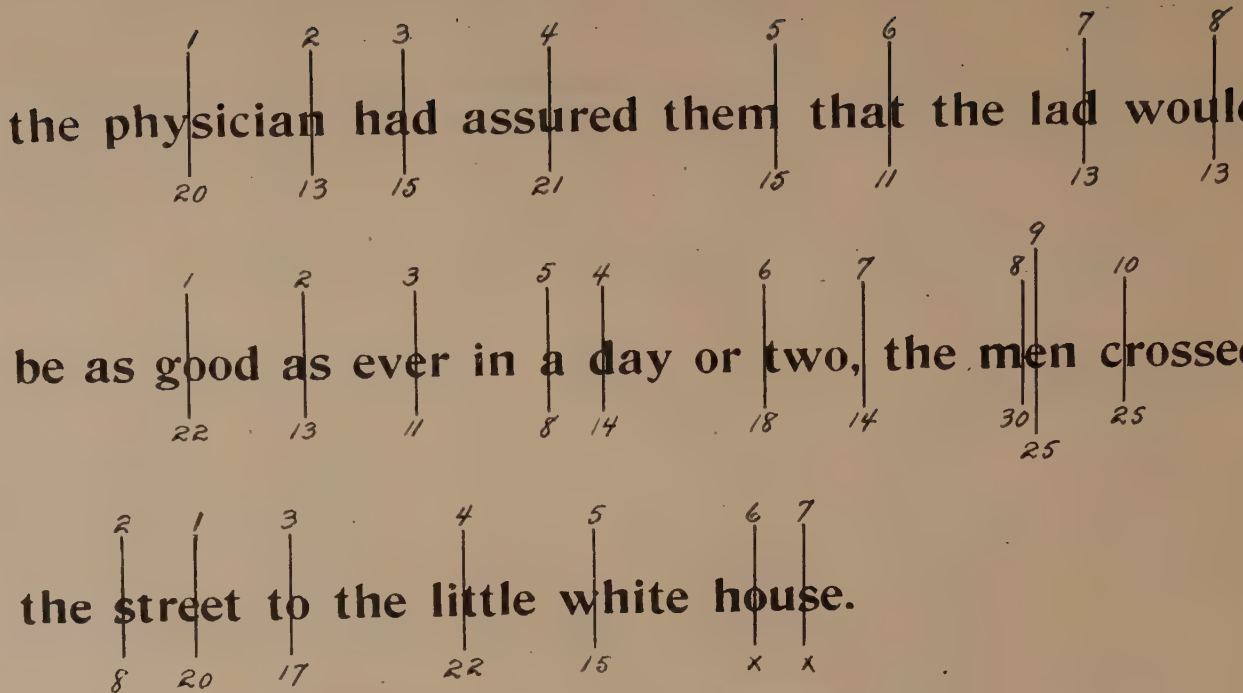

When Denny had regained consciousness, and
everything possible for his comfort and for the as=
sistance of his distracted mother, had been done; and


1 2 3 4 5 6 7 8
the physician had assured them that the lad would
17 × 10 8 18 12 14 8
1 2 3 4 5 6 7
be as good as ever in a day or two, the men crossed
18 15 18 13 11 12 16
1 2 3 4 5
the street to the little white house.
24 12 12 8 14

Oral Reading by Subject B. × indicates that it was impossible to determine with precision the length of the pause

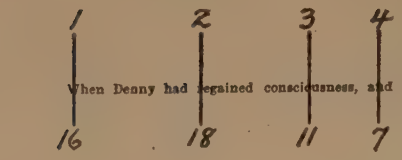
PLATE XIX

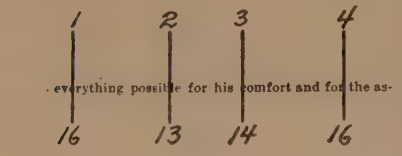

When Denny had regained consciousness, and
everything possible for his comfort and for the as=
sistance of his distracted mother, had been done; and

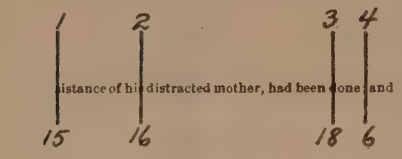

1 2 3 4 5 6 7 8
the physician had assured them that the lad would
20 13 15 21 15 11 13 13
1 2 3 5 4 6 7 9 8 10
be as good as ever in a day or two, the men crossed
22 13 11 8 14 18 14 30 25 25
2 1 3 4 5 6 7
the street to the little white house.
8 20 17 22 15 X X

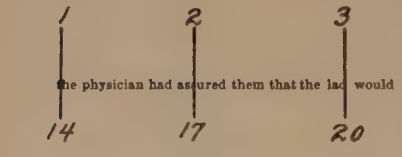
Oral reading by Subject C. × indicates that it was impossible to determine with precision the length of the pause

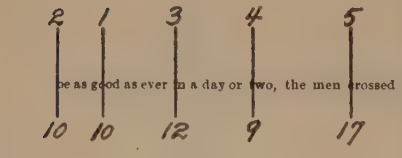
PLATE XX

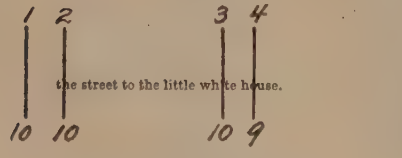






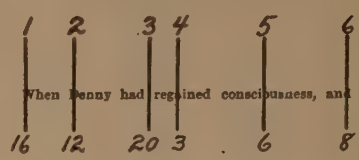


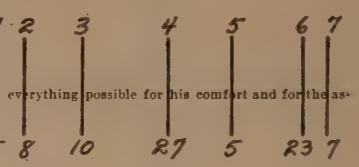


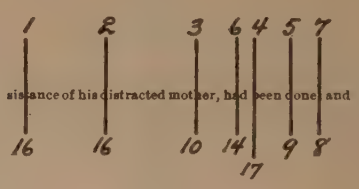


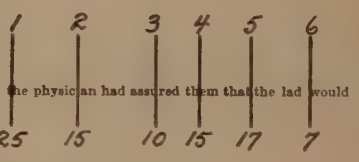
Silent reading by Subject A

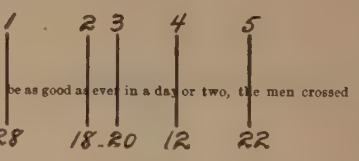
PLATE XXI

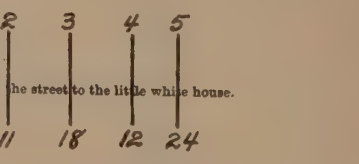






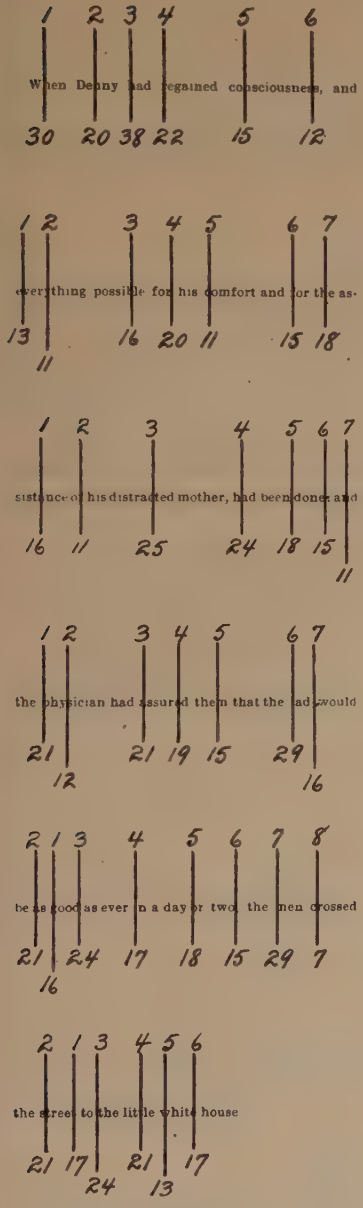






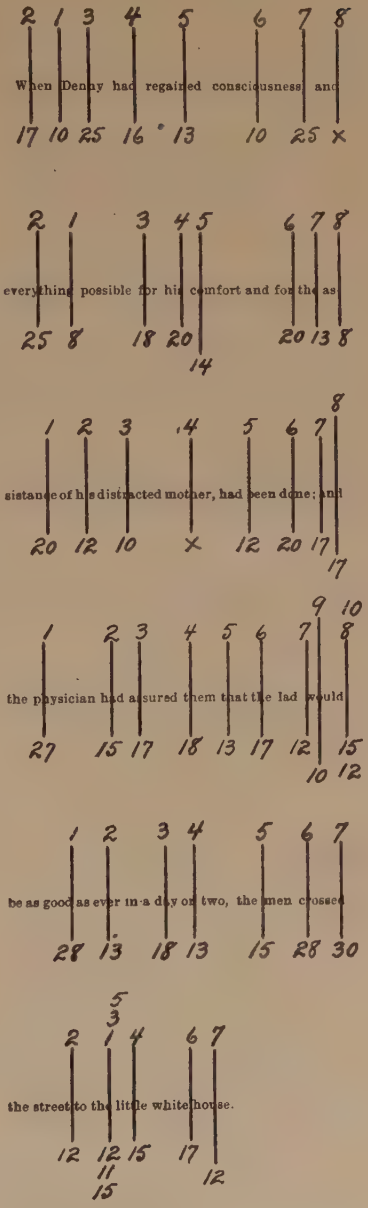
Oral reading by Subject A

PLATE XXII


1 2 3 4 5 6
When Denny had regained consciousness, and
30 20 38 22 15 12
1 2 3 4 5 6 7
everything possible for his comfort and for the as-
13 11 16 20 11 15 18
1 2 3 4 5 6 7
sistance of his distracted mother, had been done; and
16 11 25 24 18 15 11
1 2 3 4 5 6 7
the physician had assured them that the lad would
21 12 21 19 15 29 16
2 1 3 4 5 6 7 8
be as good as ever in a day or two, the men crossed
21 16 24 17 18 15 29 7
2 1 3 4 5 6
the street to the little white house
21 17 24 21 13 17

Silent reading by Subject C

PLATE XXIII


2 1 3 4 5 6 7 8
When Denny had regained consciousness and
17 10 25 16 13 10 25 X
2 1 3 4 5 6 7 8
everything possible for his comfort and for the as
25 8 18 20 14 20 13 8
1 2 3 4 5 6 7 8
sistance of his distracted mother, had been done; and
20 12 10 X 12 20 17 17
1 2 3 4 5 6 7 8 9 10
the physician had assured them that the lad would
27 15 17 18 13 17 12 10 15 12
1 2 3 4 5 6 7 8
be as good as ever in a day or two, the men crossed
28 13 18 13 15 28 30
5 3 2 1 4 6 7
the street to the little white house.
12 12 11 15 15 17 12

Oral reading by Subject C. × indicates that it was impossible to determine with precision the length of the pause.

It is therefore legitimate to reiterate the statements made above regarding the span of recognition. This is a product of personal training. Its range is dependent more largely on the individual's powers of interpretation than on the character of the sensory material.

For our later study of the reading of pupils in school this conclusion is of crucial importance and will furnish the key to all analyses of children's records.

MEANINGLESS SERIES OF LETTERS

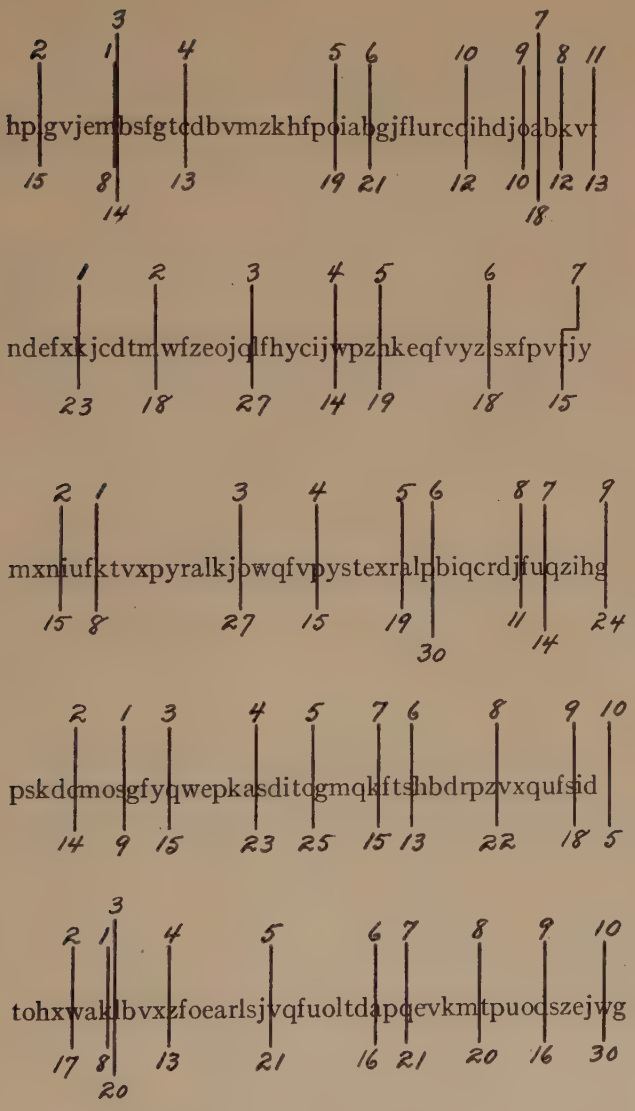
A further confirmation of the foregoing statement was secured by repeating with Reader A an experiment which has been tried by earlier investigators. A series of unrelated letters was presented to this reader and he was asked, as in the common test for marking out *a*'s, to note the letter *a* wherever it appeared. He was required to count the *a*'s rather than mark them out. In this way the record reported in Plate XXIV was secured under conditions which make it directly comparable to A's silent-reading record. The mode of perceiving isolated letters is wholly different from the mode of perceiving words. Especially interesting are the frequent backward movements. These can be noted in line 3, pauses 7 and 8, in line 6 four times, and also in other lines. The span of recognition here is also much narrower than in reading. There is a certain clumsiness in carrying out the process of recognition. It would be interesting for the purpose of experimenting in the psychology of learning to repeat the test with a view to determining what course this clumsiness would follow in its disappearance.

This record shows that where recognition is of a different type from that cultivated in reading the fixations of the eye will reflect the change in the character of the psychological situation. A line of meaningless letters requires more fixations and longer fixations than a line of meaningful words because words can be learned and recognition of them can be facilitated through training, while the selection of *a*'s is not a matter for which education can prepare in the same degree.

SUMMARY TABLE

All of the facts that have been shown in the foregoing plates are summarized in quantitative form in Table I. This table can

PLATE XXIV



Silent counting out of *a*'s by Subject A

TABLE I

SUMMARY OF THE NUMBER OF PAUSES AND THE AGGREGATE TIME OF PAUSES IN THE RECORDS OF ADULT READERS

	Reader A								Reader B					Reader C						
	Silent Reading			Oral Reading				Counting Out *a*'s	Silent Reading		Oral Reading			Silent Reading			Oral Reading			
	11-Point Type		Large Type	Small Type	11-Point Type		Large Type	Small Type	11-Point Type		Large Type	11-Point Type		Large Type	11-Point Type		Large Type	Small Type	11-Point Type		Large Type	Small Type
Line 1 P	8	6	5	4	6	7	6	6	7	5	6	7	5	6	9	8	10	6	8	10	10	8
Line 1 T	89	92	54	52	90	84	71	65	11 155	90	75	78	113	98	.....	137	152	165	137	146	193	135	.....
Line 2 P	6	5	6	4	8	7	7	7	7	5	4	4	8	8	8	9	9	7	7	11	8	10	8
Line 2 T	72	58	54	59	119	95	83	95	134	64	58	67	139	95	.....	107	140	77	104	149	156	151	126
Line 3 P	4	4	6	4	7	7	9	7	9	5	4	4	9	8	8	8	7	7	7	11	9	10	8
Line 3 T	57	56	64	55	113	114	124	90	163	71	53	66	152	96	.....	104	164	68	120	193	205	152	.....
Line 4 P	5	4	7	3	8	7	7	6	10	4	4	5	9	6	8	8	8	6	7	10	10	8	10
Line 4 T	63	57	55	51	105	101	94	89	159	50	55	79	159	85	.....	100	115	74	133	134	164	121	156
Line 5 P	4	5	6	5	8	8	9	5	10	5	3	4	11	7	7	10	8	8	8	14	12	10	7
Line 5 T	57	57	62	58	106	133	108	100	182	75	55	72	148	93	.....	156	145	102	147	141	193	180	145
Line 6 P	4	4	6	4	5	6	7	5	.....	2	4	3	7	5	5	7	6	5	6	10	6	7	7
Line 6 T	42	53	60	39	95	72	82	73	.....	111	....	.....	.....	71	.....	99	147	77	113	112	112	.....	94
Average number pauses, lines 2–5	4.8	4.5	6.3	4.0	7.8	7.3	8.0	6.3	9.0	4.8	3.8	4.3	9.3	7.3	7.8	8.8	8.0	7.0	7.3	11.5	9.8	9.5	8.3
Average time per line, lines 2–5	62.3	57.0	58.8	55.8	110.8	110.8	102.3	93.5	159.5	65.0	55.3	71.0	149.5	92.3	.....	116.8	141.0	80.3	126.0	154.3	179.5	151.0	.....
Average time per pause, lines 2–5	13.1	12.7	9.4	13.9	14.3	15.3	12.8	15.0	17.7	13.7	14.7	16.7	16.2	12.7	.....	13.3	17.6	11.5	17.4	13.4	18.4	15.9	.....

P = Number of pauses.

T = Aggregate time of pauses in fiftieths of a second.

be used to confirm in detail the statements made in the text. Special attention is called to the numbers in the horizontal lines marked "Average number pauses," "Average time per line," and "Average time per pause." These averages relate only to lines 2–5. The first line is omitted from the calculations because the eye does not begin to move normally until after this line is passed. Line 6 is omitted because it is a partial line.

SUMMARY

The results of our analysis may be summarized as follows:

1. Oral reading and silent reading are characteristically different. The number of pauses in oral reading is greater than in silent reading, and the average length of pauses is greater.

2. The unit of recognition in silent reading is broader than the unit of recognition and articulation in oral reading. In silent reading the unit of fixation for adults is sometimes the phrase, while in oral reading it is usually the word.

3. There are marked individual differences. These appear in the number of pauses and in the length of pauses. Also there are differences with respect to oral reading and silent reading, some readers being much alike in the two, most trained readers being different.

4. The unit of recognition in reading is very little affected by changes in the sensory content. Recognition depends on the training of the individual. Only slight differences in fixation appear when the type is enlarged or when it is reduced within wide limits.

5. When meaningless series of letters are perceived the type of recognition is different from that in reading. For such a series of letters the unit of recognition is small.

CHAPTER IV

ANALYSIS OF CHILDREN'S READING

This chapter will present photographic records taken from children and will make an analysis of these records similar to that made in the last chapter of records of adults. If the records presented in Chapter III are regarded as exhibiting the end toward which school training is tending, the records in this chapter will show the path which children travel in reaching this end.

The photographs were taken by C. T. Gray. He has rendered a report on the details of his work in the Supplementary Educational Monographs of the *School Review* and the *Elementary School Journal*, Vol. I, No. 5 (1917). The records used for this chapter were used in making up his tables but were not presented in this form or subjected to this type of analysis in his text.

SPECIAL DIFFICULTIES IN SECURING MATERIAL

The difficulties encountered in securing photographs from children are much greater than those encountered in working with adults. The records in this chapter are therefore somewhat less complete, especially those of oral reading. When a child reads aloud he tends to move his head in spite of the head holder, and it is nearly impossible to secure records of any length that are reliable. Fortunately for our purposes the records of silent reading are of more significance. A considerable number of good records of silent reading were secured. We are, accordingly, not seriously obstructed in our investigation by the difficulties referred to.

TYPE OF PUPILS PHOTOGRAPHED

The pupils included in this report were not trained by the alphabet method. Most of them had more or less training in phonics. All were supposed to read chiefly for meaning. As far as their training in reading had followed any explicit method it was according to the word or sentence method. The cases were

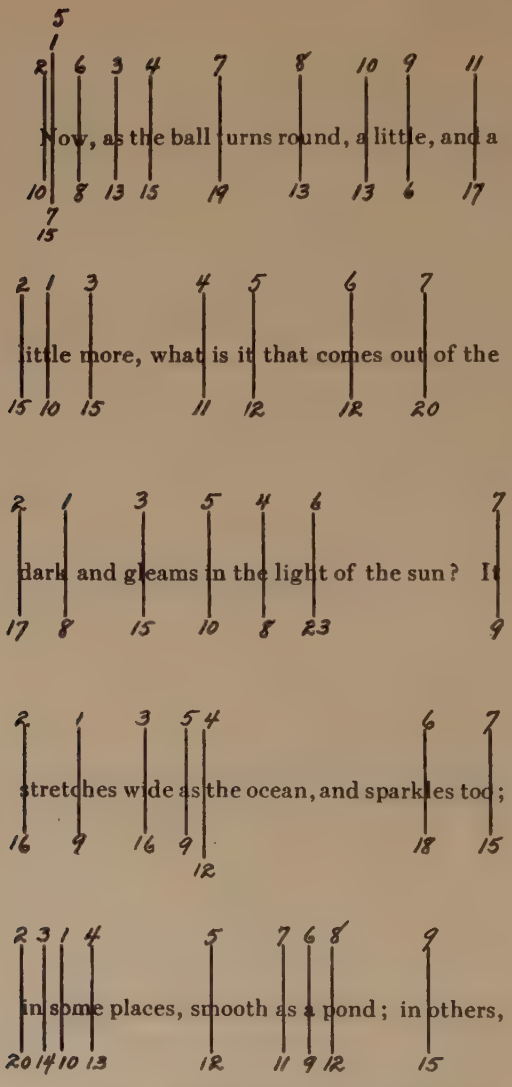
selected with a view to including the worst readers and the better readers in each grade. In some cases where photographs could not be secured of the extreme cases in the class, records of those near the extremes were used. The selection was made on the basis of an extensive series of tests which preceded the photographing. The deliberate effort to represent extremes in each grade causes some deviation of the results here reported from those of any study yet made. Indeed, in certain respects these findings seem at variance with those of earlier workers. The explanation of this difference is undoubtedly to be found in the fact that earlier investigators did not have selected cases with which to deal. The ratings of the pupils reported in this chapter conform to C. T. Gray's Table XXXVIII, which was made up as a result of a careful comparison of all the pupils in the school.

It was not possible to get records from children below the third grade because they cannot easily be held in front of the camera and are so much disturbed by the process of photographing that they give abnormal records. Photographic records of third-grade children can be relied on, as shown by the fact that the records taken during the photographing tally in character with the results of numerous independent reading tests and the reading is at the same rate as the reading exhibited in the tests.

GOOD READING IN THE LOWER GRADES

The record reproduced in Plate XXV is the silent-reading record of a third-grade child who is a rapid reader rated fair in quality of reading. This child was not the best reader in the class but gave the only complete photograph. Her rating was brought down to fair by a low score in reproducing what she read. Her unit of recognition tends to be the word. The curious gaps in lines 3 and 4 probably explain why the child is only fair in reproduction. There is no possibility of a complete understanding of passages if sections of lines are overlooked. The probabilities are that these gaps do not represent sudden enlargements of the span of recognition but rather a failure to see certain words due to some distraction of the reader. It is to be noted that in both cases the letters fixated after

PLATE XXV


Now, as the ball turns round, a little, and a
little more, what is it that comes out of the
dark and gleams in the light of the sun? It
stretches wide as the ocean, and sparkles too;
in some places, smooth as a pond; in others,

Silent reading by a rapid reader in the third grade with a fair quality record (Subject No. 2 in C. T. Gray's tables).

the gap are conspicuous letters and may have furnished strong motives for long eye-movements forward.

The record is not unlike the oral records of adults except for the irregularities noted. In general the wide units of recognition characteristic of adult silent records are absent, and the lengths of the pauses show that recognition is comparatively slow and often quite irregular. The limited units of recognition of third-grade pupils are confirmed by all the children's records and by all earlier investigations of pupils' eye-movements. The broad unit of recognition characteristic of adult silent reading is thus proved to be a matter of cultivated experience. Even here it must be remembered that we are dealing with a fair reader who has had more than two years of school experience. The fact that this child is at a level of development at which words are the common units of recognition suggests a number of questions. Is a word a common unit because of the spacing between words in ordinary printed matter, or is the spacing in printed lines the result of the printer's effort to facilitate a human habit? In the cases of adults the word is the unit in oral reading. Is there a relation between adult oral reading and the silent reading of a third-grade pupil?

REGRESSIVE MOVEMENTS

In adult records several cases were noted in which the eye returns upon the path it has traversed. A similar backward movement often appears at the beginning of lines. Backward movements are so common in children's records that they deserve special attention. For example, in Plate XXV regressive movements are shown in pauses 9–10 in line 1, pauses 4–5 in line 3, pauses 4–5 in line 4, and pauses 6–7 in line 5, besides at the beginning of every line in the plate. The regressive movements at the beginnings of lines are easy to explain. Evidently the eye, in making the long trip back to the beginning of a new line, fails to fixate the first word with precision and makes a second movement to bring about a satisfactory beginning. The short duration of the first pauses in Plate XXV, lines 1, 3, and 4, and the relatively short fixations in the first pauses in lines 2 and 5, make it clear that the first fixations are periods of readjustment rather than of complete

recognition. In cases of true regressive movements within the line the explanation is probably of somewhat the same type. The eye has made a movement which does not fit recognition. In order to get the word or letter necessary to complete recognition the eye must move back. The first pause in a regressive pair—and in a few cases the second pause—is often short, indicating that readjustment is going on in the effort to get material for recognition. Such facts appear in pause 9, line 1; pause 4, line 3; pause 5, line 4; and pause 6, line 5.

The record of a child's reading in Plate XXV lacks the fluency and breadth of units of recognition characteristic of an adult silent record. The short units of recognition, the regressive movements, the gaps, and the irregularities in the time units of fixation when taken together justify the statement that the child is very immature in his reading and consequently clumsy in his recognitions.

POOR READING IN THE LOWER GRADES

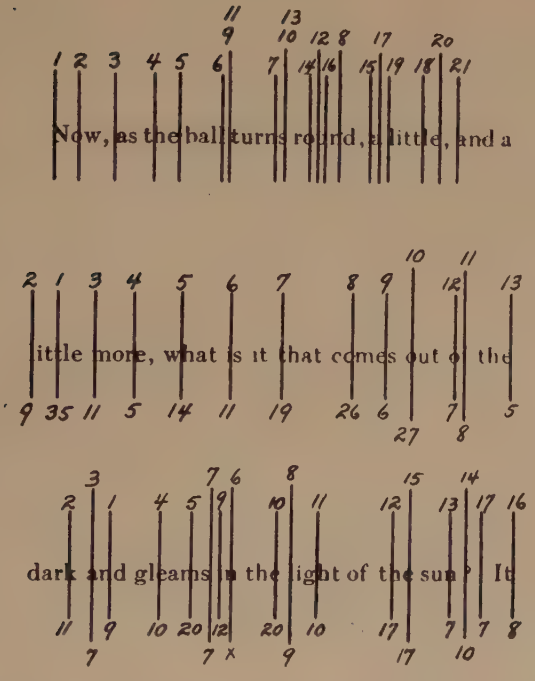
The record in Plate XXVI is taken from a third-grade pupil who is a slow reader, graded as fair. It is in striking contrast to the record shown in Plate XXV. Time records of pauses are not supplied in the first line because it was impossible to make out the time dots with precision for several of the fixations. After the first line the record was clear.

Parts of this record seem to indicate that the reader can recognize a word at a fixation. This is true in the main throughout line 2. But the second half of line 1 and several portions of the record of line 3 can be described only by the one term "confusion." The child is evidently compelled to make the greatest efforts before he can master the words. He moves his eyes about, restlessly trying by getting different views to recognize the complex of letters.

MEANING OF PERIODS OF CONFUSION

There must be a corresponding degree of mental effort during such a period of confusion. The continuity of thought must be seriously interrupted, and the mechanical side of the reading process which consists in the effort to master words must occupy the center of attention.

PLATE XXVI


Now, as the ball turns round, a little, and a
little more, what is it that comes out of the
dark and gleams in the light of the sun? It

Silent reading by a slow reader in the third grade with a fair quality record (Subject No. 9 in C. T. Gray's tables). The length of the pauses is omitted in line 1 and at × in line 3 because it was impossible to count the dots in the photograph with precision.

Even this description is probably too optimistic in its assumption that recognition results from the wanderings of the eyes. Wandering fixations represent an effort that does not in the end bring any meaning to the mind at all. In many cases confusion of the type here exhibited is followed by complete failure to recognize even the structure of the word.

This record makes it clear that fixating the eye once on each word represents a degree of mastery of words which is necessary for fluent reading. The child in the third grade who reads fluently fixates words without periods of confusion.

The designation of these complicated series of movements within a word as periods of confusion implies a definite interpretation of their meaning which should be made clear. These confusion periods are not looked on as the original types of eye-movement out of which in due time is developed the power to recognize a word. We may fairly believe that a devotee of the A-B-C method looking at Plate XXVI would say, "This child is exploring the letters in the words and will in due time develop the power of recognizing the word as a whole." The explanation implied in the word "confusion" is that these complicated series of eye-movements exhibit a failure of recognition to follow its normal course. The child, it is assumed, ought to recognize the word but does not; hence the complicated backward and forward movements.

Justification for the position taken appears in the plate. The movements are of the regressive type rather than of the straightforward progressive type which might be expected if the pupil were spelling out the words.

METHODS OF ANALYSIS OF MATERIAL PERCEIVED

The cure for confusion probably is to be found in training the pupil to make an orderly analysis of words. We have found grounds in earlier records for the statement that training enlarges the unit of recognition. We have here come on evidence which shows us the necessity of teaching analysis. There is a demand in many cases for a smaller unit than the word. Unless the school trains the pupil to work out his words systematically he will do it badly and will exhibit confusion.

It may be that proper educational methods can prevent periods of confusion. This will be better than to try to cure the difficulty after it has arisen. Confusion of the type seen in Plate XXVI seems to indicate a breakdown in educational procedure. It is certainly too common a difficulty, as will be shown in many records, to be neglected, whatever its source. It is the effort of a child to comprehend a mass of visual sensations. It is characteristic of poor readers, as shown in the records.

SCHOOL METHODS IN TERMS OF THIS DISCUSSION

The foregoing discussion can be translated into the terms ordinarily used in describing school methods. The word method begins with the assumption that the word is the natural first unit of recognition. As the words become numerous and complicated the word method usually adds a plan of phonic analysis. The motive of this added analysis is to help pupils to keep out of periods of confusion.

The matter can be put in another way. The word as a whole is a natural unit of pronunciation. It is everywhere the characteristic unit in oral reading. Confusion is evidently due to inability to master the visual elements which make up words. Confusion can be cured only by some method which teaches analysis of visual elements and an association of these visual elements with recognition on the one hand and pronunciation on the other.

In this discussion of the analysis of words we must not lose sight of the fact that the goal toward which training in reading is always directed is away from analysis. The mature reader recognizes whole phrases at a single fixation. This is not a result of analysis. It is emphatically a form of synthesis which can never be achieved if all the instruction is in the direction of analysis. It is possible for phonic analysis or spelling to be so overemphasized as to stand in the way of synthesis. Indeed, synthesis of the mature type is obstructed by an emphasis even on words. For this reason oral reading must be called sharply in question if it is overdone and carried into the upper grades.

Our study thus far has made us aware of the fact that in much of our reading the word is the unit; it has also shown the importance

of larger synthetic units and of analysis. The problems suggested by these distinctions will come up again in connection with subsequent records.

PROGRESS IN THE FOURTH GRADE

Plate XXVII shows a record which is much more mature in type than the two preceding. There is evidence here of the beginnings of synthesis, especially in line 3. There are no regressive movements except at the beginnings of lines 1 and 2. If one thinks of the good third-grade record in Plate XXV as at one end of a scale and an adult silent-reading record as at the other end of the scale, this record falls between the two and shows that progress is in the direction of free fluent movements and synthetic recognitions.

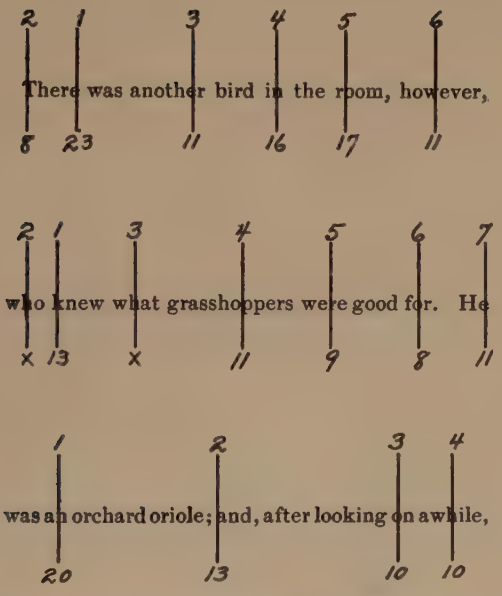
ANALYSIS AS DISTINGUISHED FROM CONFUSION

From the record of a good reader in the fourth grade we turn to Plate XXVIII, which is from a poor, slow reader in the same grade. The units of recognition here are short even where there is no confusion or minute analysis. Thus in line 1 and in the first half of line 2 all goes well, but the units are short. At the end of line 2 and at the beginning of line 3 there are two cases of extreme confusion. From fixations 8 to 14 in line 3 an example of minute analysis appears which differs from the confusion periods immediately preceding it. This minute analysis may be a letter-by-letter spelling of the words. It differs from a confusion spot in that there is only one regressive movement, namely, that from 10 to 11.

Probably the distinction between confusion and minute analysis ought not to be overemphasized. At all events they are both opposed to synthetic apprehension of phrases and both fall short of the recognition of the word as a whole.

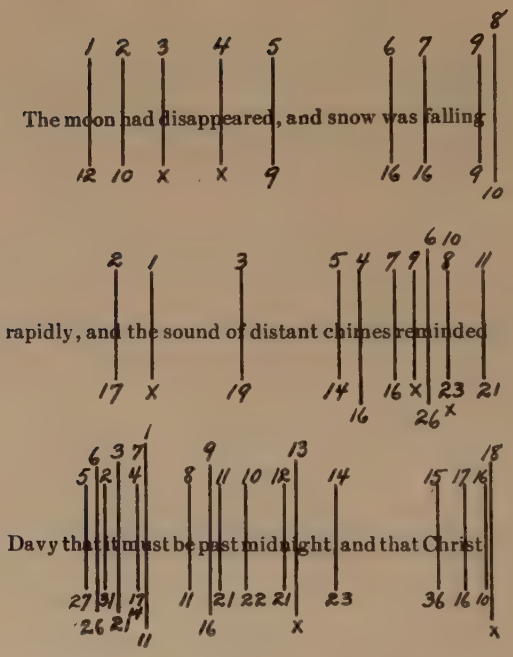
We derive from the records of poor readers a lucid explanation of why such readers do not understand what they read. We understand, also, what is meant by the statement that attention must be given in the school to the mechanics of reading. If a child is going to be distracted by his efforts to recognize words we may as well anticipate the difficulty and distract him to some purpose while we teach him how to master distractions. Training a child

PLATE XXVII


2 1 3 4 5 6
There was another bird in the room, however,
8 23 11 16 17 11
2 1 3 4 5 6 7
who knew what grasshoppers were good for. He
× 13 × 11 9 8 11
1 2 3 4
was an orchard oriole; and, after looking on awhile,
20 13 10 10

Silent reading by a rapid reader in the fourth grade (Subject No. 13 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

PLATE XXVIII


The moon had disappeared, and snow was falling
rapidly, and the sound of distant chimes reminded
Davy that it must be past midnight and that Christ

Silent reading by a slow reader in the fourth grade with a poor quality record (Subject No. 15 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

in the analysis of words may very properly be described as training him in the mechanics of reading. Purely mechanical training is in an important sense in opposition to the purpose of the school in its effort to make good readers. The school aims to reach the level of fluent synthetic grasp of phrases. Mechanical training does, indeed, temporarily prevent the pupil from understanding the meaning of passages. Mechanical training would not be justified if distractions could be avoided by ready recognitions of all words. Mechanics are justified only when they contribute to final fluent recognition of words.

SERIES OF RECORDS FROM VARIOUS GRADES

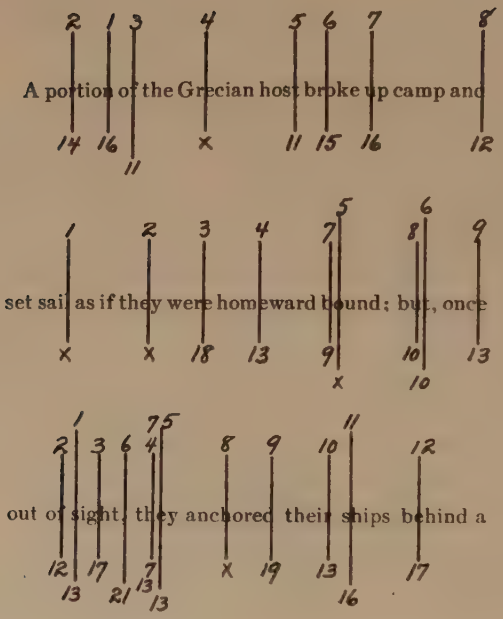
The next record, Plate XXIX, is that of a fair reader rated as the best in the fifth grade. The girl from whom this record is taken is described as nervous. It is interesting to note that at times she is confused, but the fact that she gets the meaning of what she reads shows that she knows how to extricate herself. For example, from pause 4 to pause 7 in line 3 she is confused, but she masters the situation and goes forward successfully in fixations 8 to 12. Confusion also appears in pauses 6 to 8 in line 2. The record appears in general characteristics less mature in type than the record in Plate XXVII and more mature than the record in Plate XXVIII. In all these cases some allowance should be made for difficulty of reading matter. The passages used for the different records may be of different degrees of difficulty.

Plate XXX shows the record of a poor reader in the fifth grade. The units of recognition are throughout very short. There are several regressive movements and the lengths of pauses are irregular.

In spite of these marks of immaturity the record is free from any gross cases of confusion. In line 1, fixations 11 and 12, and in line 3, fixations 7 to 10, there is a suggestion that regressive movements within the line are the last remnants of spots of confusion.

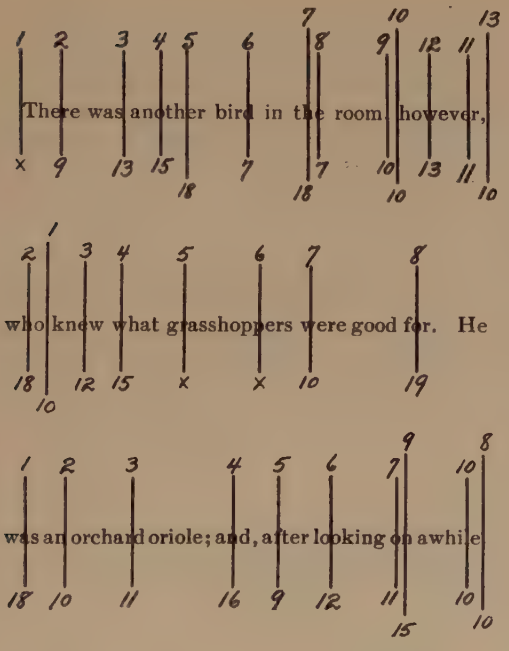
Plate XXXI shows the record of a good reader in the sixth grade. This record has the characteristics of a mature adult record.

PLATE XXIX


A portion of the Grecian host broke up camp and
set sail as if they were homeward bound; but, once
out of sight, they anchored their ships behind a

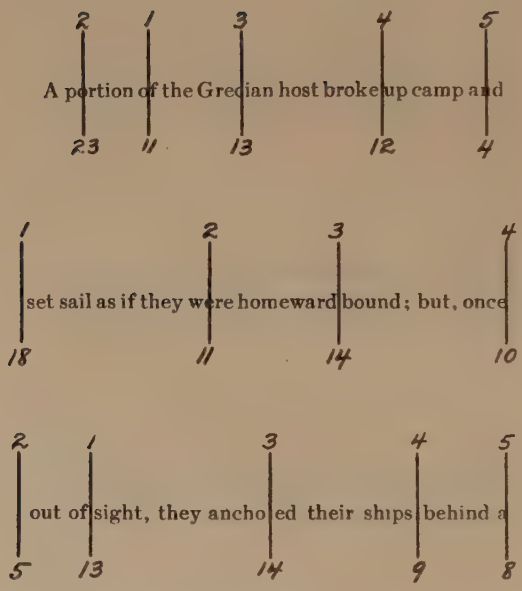
Silent reading by a fair reader in the fifth grade (Subject No. 24 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

PLATE XXX


There was another bird in the room, however,
who knew what grasshoppers were good for. He
was an orchard oriole; and, after looking on awhile

Silent reading by a poor reader in the fifth grade (Subject No. 23 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

PLATE XXXI


2 1 3 4 5
A portion of the Grecian host broke up camp and
23 11 13 12 4
1 2 3 4
set sail as if they were homeward bound; but, once
18 11 14 10
2 1 3 4 5
out of sight, they anchored their ships behind a
5 13 14 9 8

Silent reading by a good reader in the sixth grade (Subject No. 31 in C. T. Gray's tables).

Plate XXXII shows the record of a poor reader in the seventh grade. The characteristic fact here is that the reader is painfully slow and that the scope of each perception is very narrow. There are occasional regressive movements. In a way the danger in this situation is even greater than in the situations discovered in the lower grades. Here the pupil gets through the task of reading by slow and painful methods. His habits are evidently becoming fixed while his methods are wrong.

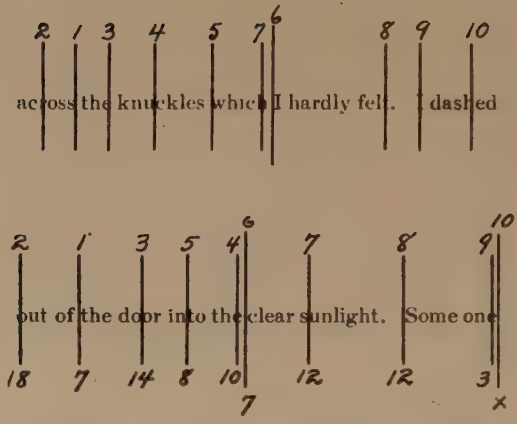
Where the pupil got such bad methods is difficult to say. Possibly he acquired them through his own unguided efforts. It is not at all impossible that he got the first suggestion of short units of recognition from phonic work or spelling taught in the school. Whatever the source, these short units of recognition represent a pernicious limitation of the child's efforts. His habits are the more pernicious because they are reinforced by the natural tendencies toward visual analysis and run counter to the demand for broad units of recognition comprehending meaningful phrases.

In an earlier paragraph we had occasion to point out that phonic analysis is a possible means of helping a pupil out of confusions. We encounter in the short units of recognition one of the possible dangers of phonic or other analytical methods.

THE COURSE OF PROGRESS IN READING

If we review the records examined, from the immature reading in the third grade to the mature form of reading exhibited in the sixth-grade record, it is possible to describe the progress of the pupil in some such general terms as the following. The pupil starts with no very definite ability to recognize written or printed matter. Ultimately he is to arrive at the point where he can take in at each fixation a whole phrase made up of many letters. If, in passing from the first vague recognition to the mature recognition of phrases, he is given too much to see or is pushed so fast that he encounters unfamiliar combinations, he becomes confused. If, on the other hand, the units of recognition are made too short and are drilled too much in detail, then he never learns to comprehend in a single act of recognition more than a few elements. Either confusion or the habit of seeing few letters will defeat the purpose of

PLATE XXXII


2 1 3 4 5 7 6 8 9 10
across the knuckles which I hardly felt. I dashed
2 1 3 5 4 6 7 8 9 10
out of the door into the clear sunlight. Some one
18 7 14 8 10 7 12 12 3 ×

Silent reading by a poor reader in the seventh grade (Subject No. 36 in C. T. Gray's tables). In the first line and at × it was impossible to determine with precision the length of the pauses.

instruction. If, on the other hand, familiarity with words and combinations of words is cultivated in such a way as to lead to synthesis of larger wholes, the pupil will pass rapidly from recognition of words to synthetic mastery of large units.

No one who has sympathetically studied records of the type discussed will have the slightest doubt what all the experimentation is about when schools try to find methods of helping pupils to recognize what is presented in a line of printed matter.

Plate XXXIII shows the record of a good reader in the seventh grade. The contrast with the record in Plate XXXII of a pupil in the same grade furnishes an impressive example of individual differences. The handicap of the child who cannot recognize words in getting information out of a book is very great as contrasted with the advantage enjoyed by the well-prepared pupil. It is clear that the pupil who has the power exhibited in Plate XXXIII will have the advantage in every respect in school work.

RELATION OF THE FOREGOING ANALYSES TO STUDIES OF SPEED

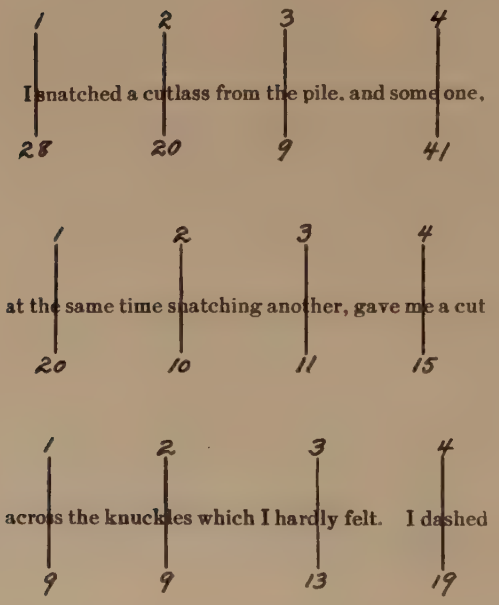
It may be well to point out the relation of these findings to speed in reading. It has been shown in a number of recent investigations, notably by William S. Gray,[1] that the rapid reader is in general the one who can reproduce most completely what he has read. The meaning of the statement is clear from these records. The child who reads rapidly has a good technique of reading. His processes of recognition are unconfused and wide in scope. The pupil who is not well trained is tangled up in confused perceptions or absorbed in short units of recognition and cannot give attention to the meanings of passages.

DIFFERENT LEVELS OF ABILITY IN THE HIGH SCHOOL

Plates XXXIV and XXXV present the now familiar contrast between a good reader and a poor reader. These two readers are taken from high-school classes.

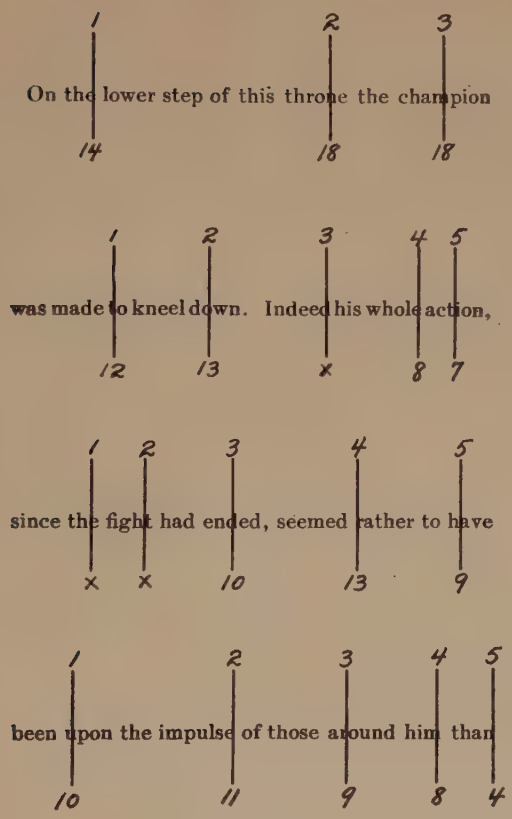
[1] William S. Gray, *Studies in Elementary-School Reading through Standardized Tests*, Supplementary Educational Monographs of the *School Review* and the *Elementary School Journal*, Vol. I, No. 1 (1917), p. 136.

PLATE XXXIII


1 2 3 4
I snatched a cutlass from the pile. and some one,
28 20 9 41
1 2 3 4
at the same time snatching another, gave me a cut
20 10 11 15
1 2 3 4
across the knuckles which I hardly felt. I dashed
9 9 13 19

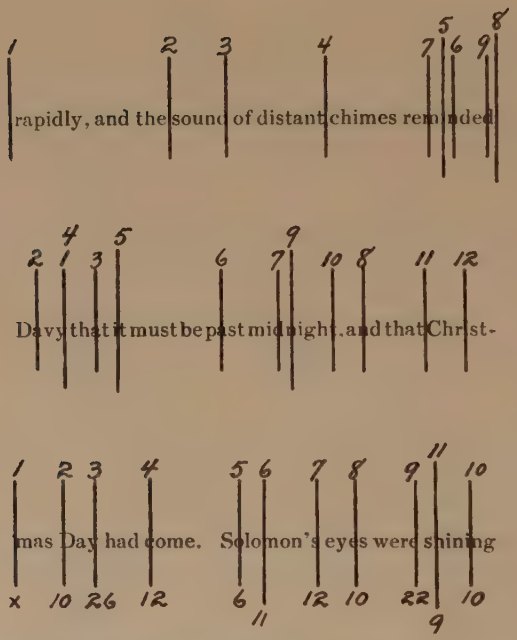
Silent reading by a good reader in the seventh grade (Subject No. 41 in C. T. Gray's tables).

PLATE XXXIV


1 2 3
On the lower step of this throne the champion
14 18 18
1 2 3 4 5
was made to kneel down. Indeed his whole action,
12 13 x 8 7
1 2 3 4 5
since the fight had ended, seemed rather to have
x x 10 13 9
1 2 3 4 5
been upon the impulse of those around him than
10 11 9 8 4

Silent reading by a good reader in the high school (Subject No. 43 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

PLATE XXXV


rapidly, and the sound of distant chimes reminded
Davy that it must be past midnight, and that Christ-
mas Day had come. Solomon's eyes were shining
x 10 26 12 6 12 10 22 10

Silent reading by a poor reader in the high school (Subject No. 49 in C. T. Gray's tables). In the first two lines and at × it was impossible to determine with precision the length of the pauses.

Even though the reader whose record is presented in Plate XXXV can be described as in advance of the poorest readers of lower grades, there are clear evidences of what we have called confusion. Thus at the beginning of line 2 there is a halting start. From pause 5 to pause 9 in line 1 there is confusion, and again from pause 7 to pause 10 in line 2. There is double fixation of certain words, as in pauses 3, 6, and 7, line 3, and pauses 11 and 12, line 2. These distractions are enough to make reading a difficult process for the individual. The freedom and swing in Plate XXXIV promise much for the study of history or science or any other subject which calls for reading free from the mechanics of recognizing words.

That a high-school record should show the imperfections exhibited in Plate XXXV is a highly significant fact. The assertion is often made that high-school students are not able to get the meaning from the printed page. Here is direct evidence of the validity of that statement. The student represented in Plate XXXV may by sheer perseverance get his lessons, but the effort involved in reading greatly increases his labor. The simplest and most desirable solution of the problem in his case would be to correct the imperfect reading habit.

Such a case raises at once the question, Why does the high school fail to check up the students in their reading habits? The answer is that the high school assumes that all students can read well when they come from the eighth grade. This assumption has no justification in experience. A very large number of pupils in the upper grades do not read well. Methods of diagnosis somewhat less elaborate than those described in the text must be devised for the detection of these poor readers. In the meantime one of the most important lessons from this study will be lost if it is not clearly recognized that side by side in the same grade and in the same high-school class are pupils who are very widely separated in reading ability. In the degree in which this is true our methods of teaching reading are unsuccessful and our methods of testing our results have up to this time been defective.

ORAL AND SILENT READING OF IMMATURE READERS

All of the foregoing records have been records of silent reading. The contrast between silent reading and oral reading which was pointed out in the study of adult records may be worth confirming. Three plates are presented: Plates XXXVI, XXXVII, and XXXVIII. Plate XXXVI is from a fifth-grade pupil rated fair, whose corresponding silent record is not complete. This fifth-grade record is one of the few satisfactory oral records secured with a lower-grade child and is inserted in spite of the fact that there is nothing to permit a direct comparison. A vague, general comparison with the fourth- and fifth-grade records of silent reading above presented is not wholly unjustifiable. The record shows that fixations are long in duration and numerous, indicating that here as in the adult records the eyes are waiting for the vocal cords.

The record in Plate XXXVII shows one satisfactory line from the same pupil who gave the very good record in Plate XXXI. The contrast is of the type which became familiar in the study of adult records.

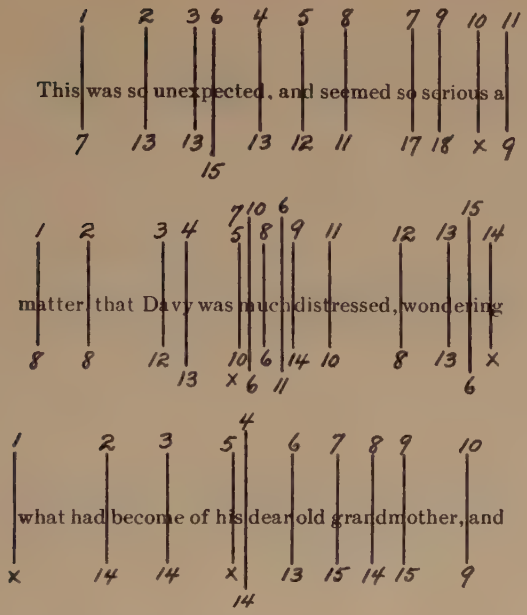
Plate XXXVIII is from the pupil who gave the excellent record in Plate XXXIII.

These three examples of oral reading are enough to confirm the conclusions of the last chapter with regard to the characteristic differences between oral reading and silent reading.

GRAY'S GENERAL TABLE OF FIXATIONS

The details presented in the foregoing plates will make intelligible the general body of facts collected by C. T. Gray and published in his Table XXXVIII. This table is accordingly reproduced here in Table II. It gives averages for each of the readers reported in the plates. In some cases the plates do not report all of the lines of printed matter on which Gray's figures are based. The table also reports a number of persons who are not included in the plates here reproduced. The results discussed in this chapter are given greater generality by an appeal to Gray's full table.

PLATE XXXVI

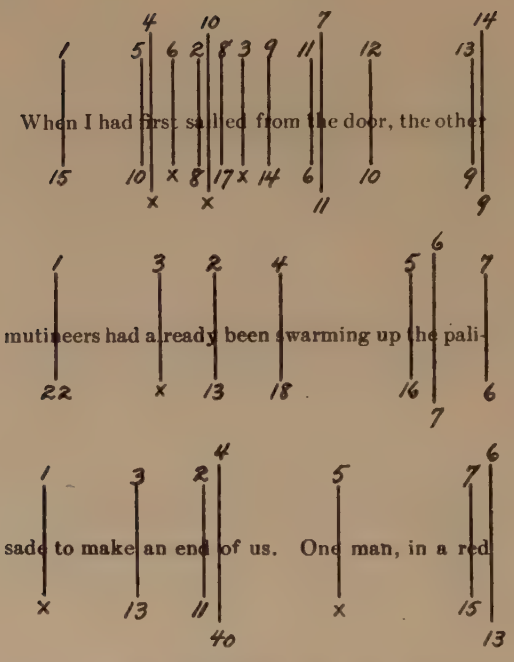

This was so unexpected, and seemed so serious a
matter that Davy was much distressed, wondering
what had become of his dear old grandmother, and

Oral reading by a fair reader in the fifth grade (Subject No. 18 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

PLATE XXXVII

Oral reading by the reader whose record for silent reading is shown in Plate XXXI. × indicates that it was impossible to determine with precision the length of the pause.

PLATE XXXVIII


When I had first sailed from the door, the other
mutineers had already been swarming up the pali-
sade to make an end of us. One man, in a red

Oral reading by the pupil whose record for silent reading is shown in Plate XXXIII. × indicates that it was impossible to determine with precision the length of the pause.

TABLE II

DATA CONCERNING EYE-MOVEMENT RECORDS IN SILENT READING

Grade	Subject	Average No. of Pauses per Line	Average Length of Pauses	Average Variation for Length of Pauses	Average No. of Regressive Movements	Average Length of Regressive Movements	Average Variation for Length of Regressive Movements	Silent-Reading Rate
3	1	13.8	18.2	6.9	4.1	19.6	6.2	3.1–1.3
	2	7.9	13.5	3.6	2.0	14.6	2.8	4.5–2.5
	3	9.2	12.9	4.0	4.0	13.3	3.9	3.6–2.1
	4	6.2	12.8	2.1	0.3	3.7	0.0	4.1–2.2
	6	7.3	15.6	5.2	1.0	8.5	0.5	3.3–1.9
	7	7.1	11.8	2.2	1.3	12.2	0.2	5.8–2.5
	8	14.0	15.6	4.2	3.0	16.6	1.1	1.9–0.8
	9	14.5	13.1	4.8	3.5	11.0	3.5	2.5–1.9
Average		10.0	14.2	4.1	2.4	12.4	2.3	.....
4	10	6.7	10.9	2.3	0.9	5.9	0.3	3.1–1.7
	11	5.6	10.5	2.7	1.2	9.5	1.0	2.7–1.6
	12	11.0	.....	.....	4.5	.....	.....	3.0–1.6
	13	7.4	.....	.....	1.6	.....	.....	2.4–1.3
	15	12.3	16.9	3.7	3.0	15.2	2.5	2.2–1.0
	17	11.5	11.9	2.9	1.5	15.5	1.5	2.0–1.2
Average		9.1	12.5	2.9	2.1	11.5	1.3	.....
5	18	9.0	14.7	4.3	1.0	8.6	0.3	3.1–1.7
	19	10.7	11.3	3.3	3.2	12.8	4.3	2.9–1.2
	21	7.0	14.5	4.2	1.0	11.1	0.4	3.5–1.5
	22	13.0	.....	.....	4.3	.....	.....	2.3–0.8
	23	10.3	12.6	2.9	1.0	15.3	0.0	3.8–1.4
	24	7.0	16.0	3.1	2.0	12.5	0.5	4.1–2.1
	25	13.0	.....	.....	4.5	.....	.....	3.0–1.2
Average		10.0	13.8	3.5	2.4	12.0	1.1	.....
6	26	15.5	15.4	5.7	4.5	13.4	3.4	2.9–0.8
	27	4.0	12.2	3.2	0.0	.....	.....	5.3–1.8
	28	9.3	13.9	3.4	1.7	15.6	1.7	3.7–1.3
	29	6.3	12.1	2.4	1.1	9.1	0.5	4.1–2.1
	30	5.8	11.2	2.1	0.5	3.9	0.2	6.0–4.3
	31	4.6	11.0	2.7	1.0	10.3	0.2	5.6–2.5
	32	7.5	11.5	2.0	1.0	6.8	1.8	4.6–1.6
Average		7.5	12.5	3.1	1.4	9.8	1.3	.....
7	33	7.0	.....	.....	2.0	.....	.....	4.1–2.5
	34	10.5	15.3	4.3	2.0	13.3	1.2	3.4–1.3
	35	9.3	14.4	4.7	2.0	17.7	1.5	3.0–1.9
	36	10.7	11.4	3.5	3.2	11.0	2.2	3.4–1.9
	37	8.2	13.5	3.4	0.7	4.4	0.1	4.1–1.6
	38	8.1	13.1	3.3	2.0	10.4	0.6	5.9–2.0
	39	7.0	12.9	3.5	1.0	9.5	0.8	5.9–2.8
	40	5.0	14.0	2.4	0.0	0.0	0.0	4.6–2.4
	41	4.6	14.1	3.1	0.5	5.5	0.2	3.5–2.1
Average		7.8	13.6	3.5	1.5	9.0	0.8	.....

TABLE II—*Continued*

Grade	Subject	Average No. of Pauses per Line	Average Length of Pauses	Average Variation for Length of Pauses	Average No. of Regressive Movements	Average Length of Regressive Movements	Average Variation for Length of Regressive Movements	Silent-Reading Rate
H.S.	42	6.0	12.8	2.5	0.0	0.0	0.0	4.9–2.5
	43	6.3	10.4	1.8	1.1	6.0	0.7	6.5–3.5
	44	7.0	.....	.....	0.5	.....	.....	4.7–2.0
	45	8.6	.....	.....	2.1	.....	.....	3.9–2.6
	46	4.6	.....	.....	0.4	.....	.....	4.6–1.9
	47	5.4	11.4	3.3	0.6	4.7	0.0	6.5–3.3
	50	6.2	10.1	2.2	0.6	4.9	0.2	5.1–2.1
	51	7.1	12.8	2.6	1.1	12.4	0.2	4.6–2.1
Average	.....	6.4	11.5	2.5	0.8	5.6	0.2	.....
C	52	5.1	8.7	3.1	1.0	10.3	0.2	8.2–3.8
	53	8.8	11.9	2.9	2.0	10.3	1.8	8.2–3.1
	54	5.0	11.0	1.4	0.1	1.2	0.0	8.2–3.4
	55	8.4	12.3	2.1	1.2	10.6	0.4	4.1–2.4
	56	7.6	9.9	2.5	1.4	12.8	0.8	6.8–3.3
	57	5.2	12.5	2.8	0.7	5.2	0.05	10.0–3.6
	58	6.8	10.4	2.2	1.0	6.9	0.1	6.8–3.1
	59	8.2	13.8	4.3	1.2	7.7	0.5	6.0–2.8
Average	.....	6.9	11.3	2.6	1.1	8.1	0.5	.....

SUMMARY

Immature readers are characterized by a narrower span of recognition than that exhibited by mature readers.

Poor reading in the upper grades is in many cases characterized by a persistence of short units of recognition. Such short units apparently may become fixed if, indeed, they are not induced by excessive emphasis on methods of analysis.

Periods of confusion appear in the reading of immature pupils. With increased training these become less marked and less frequent, but traces of them persist in the records of poor readers even in the upper grades and high school.

There are evidences that analysis may train a pupil to proceed by very short steps through a series of words and letters which at first are unrecognized.

In the third grade the word is the longest unit of perception commonly found even in good readers. In a few cases short phrases are recognized at a single fixation. The fourth grade

exhibits more mature types of reading, and above this grade records show a steadily increasing number of cases in which phrases are recognized in a single fixation.

Poor readers in the upper grades are characterized by long fixations, by short spans of recognition, including very often only small groups of letters, by regressive movements, and by traces of confusion. The reading process is in these cases evidently ineffective because the reader has not overcome mechanical difficulties and distraction.

The contrast between oral reading and silent reading which was described in an earlier chapter is fully confirmed by the records of pupils.

Individual differences are marked. Pupils in the same grade differ radically in their methods of reading. These differences appear even in the upper grades and in high school.

CHAPTER V

SPECIAL EXPERIMENTS IN THE TRAINING OF PUPILS

EXPERIMENTAL TRAINING OF SLOW AND INEFFECTIVE READERS

This chapter will report in full the cases of four pupils who were very poor in reading and were given special training. This special experimental training was accompanied by careful records and tests repeated at frequent intervals. The cases were selected as the worst in their grades, and every effort was made to benefit the pupils at the same time that their difficulties were investigated and the changes resulting from their training measured.

Some beginnings of experimental work of this type were made during the first year of the investigation. The results of the present analysis of the reading process were not in hand at that time and the experimental training was not as fully under control as it was during the second year. Furthermore, the training was administered during the first year by college students, whereas during the second year the experiments were in the hands of an experienced teacher. Some of the results of the preliminary work are reported by C. T. Gray in the monograph referred to above.

The studies described in the present chapter were made by Miss Katherine McLaughlin and the cases are reported by her. Her work extended over three periods of about six weeks each, beginning in the fall of 1916 and continuing to the middle of May, 1917. The Christmas holidays and an interruption in March divided the training into the periods stated. Each pupil was given from twenty to twenty-five minutes four days a week. The tests to which reference is made throughout the chapter are the standardized oral-reading tests of William S. Gray and the passages used in the silent-reading tests by C. T. Gray.

CASE G IN THE FIFTH GRADE

The first case is that of a girl in the lower fifth grade, age 10 years and 4 months when selected for special training in November, 1916.

This girl had been included in the tests and photographs made earlier in 1916 and proved to be a slow, inefficient reader. Her photographic record for silent reading was one of the worst in the whole series. It is exhibited in Plate XXXIX. Every type of difficulty known to those who have followed the analyses made in the last two chapters appears in this record. The second line begins badly. There are numerous regressive movements, as in pauses 3–4, 5–6, 8–9–10, 11–12, in line 1 and throughout line 2. The units of recognition are very small. The spots of confusion appear notably in pauses 11–19 in line 2. The whole record makes it clear that the pupil could not unravel the intricacies of the printed lines which proved easy to many of her classmates.

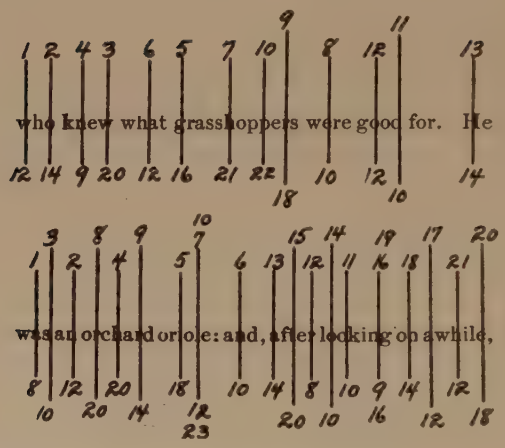
The girl, Case G, entered the first grade of the Elementary School of the University of Chicago when six years and two months old; left the city at the end of the year; entered the second grade in the public school of a small town in a neighboring state; returned to Chicago again after a year's absence and entered the low third grade of the public schools of Chicago. In the middle of the same year she re-entered the University Elementary School in the high third grade.

The school physician's record shows that she is a normal, healthy child, with no special defects in eyes, ears, or throat. She was absent sixteen days during her two and a half years in this school; eleven of these absences were in Grade I A. She is very slow in movements but responsive in her reactions when especially interested.

She is rated by her teachers as a good student in subjects other than reading. Her school record in handwork, drawing, penmanship, and mathematics is very good (B+ and A), and good (B) in history, geography, and science. In reading, however, she has stood consistently at C or D from the first through the fourth grade.

Reading seems to be her greatest weakness. Her fourth-grade teacher reported her as "a slow reader who reads hesitatingly and haltingly, repeating words and phrases. Her breathing is very shallow, often causing her to pause for breath in the middle of a word or phrase. Her voice is thick, heavy, and unpleasantly nasal.

PLATE XXXIX



Silent reading of Pupil G before special training (Subject No. 16 in C. T. Gray's tables).

Silent reading is particularly distasteful to her. She always settles down to it reluctantly and tardily."

From the home comes much the same story. "She has never read a story to herself, though she has several attractively illustrated children's books. She frequently, however, after eagerly studying the illustrations in a new book, begs to have the story read to her, saying, 'You read it, mother. I can't understand it very well when I read it myself.'"

The various tests given to this pupil disclosed some interesting facts about her difficulties in reading. In the oral test (W. S. Gray's Standard Oral-Reading Test) her rate for the first ten selections averaged 1.95 words per second with a range of 3.2 to 1.1. The record of errors is given in Table III.

TABLE III

MISTAKES MADE BY CASE G IN ORAL-READING TEST

Mispronunciations	16
Omissions	8
Repetitions	6
Insertions	5
Substitutions	2
Total	37

The pronunciation of unfamiliar words seemed most difficult. She usually hesitated a moment before attacking a new word and then whispered to herself the spelling of the word letter by letter. The repetitions all occurred in phrases containing a difficult word. The omissions were almost entirely the small words: "his," "the," "and," etc. On the basis of rate and errors her score was 33. This is considerably below the standard for the grade.

The tests of her silent reading made with passages used by C. T. Gray gave the facts presented in Table IV in regard to rate and comprehension.

The rate in silent reading shows an unusual condition. It is practically .6 of a word slower than the oral rate. This fact taken in connection with the score for comprehension shows clearly what the child had discovered for herself, namely, that she does not understand much of the "story" when she reads silently.

Observations made during the silent-reading tests showed that there was much vocalization. The reading was done in a low whisper, and difficult words, as stated above, were spelled out letter by letter. She followed the line with her finger. In one of the early practice periods, when urged to read more rapidly, she remonstrated, saying that she could not hear the words so well if she did.

TABLE IV

SILENT-READING RECORDS FOR CASE G

	Selections of Series Used by C. T. Gray	Time	Rate in Words per Second	Range	Comprehension
Reading to answer questions	1–9	9:23	1.4	2.9–0.9	Percentage 63.3
Careful reading for reproduction	1–3	2:40	1.4	2.6–1.6	28.5
Rapid reading	1–3	3:43	1.4	1.9–1.2	19.1

From the foregoing data it is evident that her difficulties in reading were due to a lack of familiarity with printed words and a lack of method of working out new or unknown word forms. In an effort to help her overcome this handicap she was given various types of training during eighteen weeks. The first six weeks were devoted to a great deal of oral reading. The second six weeks were spent on drills in phonics and in word analysis. During the last six weeks she was given a great deal of silent reading. While each period of six weeks thus stressed some one phase of reading, all three types of work were carried along throughout the eighteen weeks. For example, oral reading was continued with less emphasis during the last twelve weeks.

The selections for oral reading were made along the line of the pupil's school interests in history and geography. These included Baldwin's *Fifty Famous Stories* and *Thirty More Famous Stories*, Harding's *Story of Europe*, Allen's *Industrial Europe*, Carpenter's *Europe*, "Our European Cousins Series," the Merrill and the Horace Mann *Third* and *Fourth Readers*, Tappan's *Old World Heroes*, Terry's *The New Liberty*, and Brown's *English History Stories*.

Records of rate and accuracy were taken from time to time; but since the selections read gradually increased in difficulty it is impossible to make direct comparisons that show the whole improvement. However, the oral rate shows a slight increase, and the quality improves very clearly during the eighteen weeks of training.

TABLE V

RATE AND QUALITY OF ORAL READING BY CASE G DURING THE PERIOD OF SPECIAL TRAINING

	Rate	Errors per 100 Words
First six weeks	2.4	4.5
Second six weeks	2.5	2.1
Third six weeks	2.7	1.1

Phonics and word analysis were emphasized during the second six weeks. Various systems of phonics with some modifications to suit the particular needs were used. Words mispronounced in oral-reading lessons were worked out phonetically, and lists of words similarly pronounced were built up and reviewed from time to time. There seemed to be a gradual growth in ability to attack an unfamiliar word. In the earlier period the pupil frequently looked at the word helplessly or pronounced a known syllable but was unable to attack it at all phonetically. She usually asked the instructor to pronounce it. Later she began immediately to sound the new word phonetically, and though sometimes making a mistake in the length of the vowel or in the position of the accent her manner of attack indicated that she had confidence in her own ability to work it out.

From Table VI it is readily seen that there was a reduction in the number of mispronunciations per hundred words even though, as explained above, the oral-reading selections gradually increased in difficulty.

Silent reading was emphasized during the last six weeks after some training in silent reading had been given throughout the first twelve weeks. For special training paragraphs or selections dealing with topics of particular interest to the pupil were used. In many instances the original selections were edited, and the words which had been used in the phonic exercises were woven into the text.

Frequently before the silent reading began a question was raised the answer to which was to be found in the text. Oral or written reproduction or a discussion of the thought of the selection usually followed the reading. It is interesting to note in passing that though no effort was made to reduce the vocalization so perceptible at first it entirely disappeared except when an unusually difficult passage was encountered.

TABLE VI

ERRORS MADE BY CASE G IN ORAL READING DURING THE EIGHTEEN WEEKS OF TRAINING

	Number of Words	Mispronunciations	Mispronunciations per 100 Words	Omissions	Substitutions	Repetitions	Insertions	Total Number of Errors	Average Errors per 100 Words
First period of six weeks...	650	19	2.9	4	0	6	0	29	4.5
Second period of six weeks.	1,745	10	0.6	11	7	6	2	36	2.1
Third period of six weeks..	5,164	11	0.2	16	5	20	6	58	1.1

The record of rate and comprehension kept throughout the eighteen weeks is given in Table VII.

TABLE VII

RATE AND COMPREHENSION FOR SILENT READING BY CASE G DURING THE EIGHTEEN WEEKS OF TRAINING

	Rate	Comprehension
First six weeks.....	2.4	22 per cent
Second six weeks.....	3.4	60 per cent
Third six weeks.....	3.6	74 per cent

The silent- and oral-reading tests given before the practice period began were repeated. The results are given in Table VIII.

The pupil showed by her whole manner that she felt competent to do the task. She wrote with a precision and directness not at all characteristic of her earlier tests. The tests in oral reading also showed a gain in rate and a reduction in the number of errors.

There is a gain of .63 of a word in rate and a decrease of twenty-three errors, or a gain of 62 per cent. This result is fully in accord with the daily records kept throughout the eighteen weeks.

TABLE VIII

SILENT-READING RECORDS FOR CASE G BEFORE AND AFTER TRAINING

	BEFORE PRACTICE	AFTER PRACTICE
	Average Rate	
Reading for questions	1.4	3.9
Reading for reproduction	1.4	3.5
Reading for speed	1.4	4.4
	Range	
Reading for questions	2.9–0.9	5.3–3.1
Reading for reproduction	2.5–1.6	5.6–3.1
Reading for speed	1.9–1.2	5.2–4.1
	Percentage Correct	
Reading for questions	63.3	81.5
Reading for reproduction	28.5	55.5
Reading for speed	19.1	56.2

TABLE IX

ORAL-READING RECORDS FOR CASE G

SELECTION	BEFORE PRACTICE			AFTER PRACTICE		
	Time	Rate	Errors	Time	Rate	Errors
1	15	3.20	3	10.0	4.80	0
2	16	3.06	1	12.5	3.12	0
3	21	3.04	2	16.5	3.63	1
4	25	2.44	0	17.5	3.48	0
5	29	2.04	2	18.5	3.24	2
6	29	2.10	5	21.5	2.88	3
7	27	1.93	4	22.0	2.40	2
8	34	1.58	2	25.0	2.16	1
9	39	1.31	9	33.0	1.57	1
10	43	1.05	9	34.0	1.30	4
Total	278		37	210.5		14

Total number of words read, 545. Rate for all passages before practice, 1.95; after practice, 2.58.

In order to find what part of this gain may be attributed to the special work given, another pupil in the same grade of about the same ability in reading, who had no special training, was tested before and after the period during which Pupil G was trained. The results are presented in Table X.

By comparing the records of the two pupils it is seen that the special Pupil G made a net gain of .63 in oral rate and 2.5 in silent rate. Furthermore, she is beginning to establish a silent-reading rate while the second pupil continues to read silently at the same rate as she does orally. The gain made by Pupil G in rate of silent reading is even more significant when it is remembered that her silent rate was less than her oral rate of reading before practice began. The gain in comprehension, while not striking, places Pupil G at a normal level for the grade while the other student is still below average.

TABLE X

SUMMARY OF ORAL- AND SILENT-READING RECORDS FOR CHECK CASE COMPARED WITH CASE G

	ORAL READING			SILENT READING		
	Rate	Errors	Range	Rate	Range	Percentage Correct
Before G's practice period	1.6	46	2.7–0.8	1.60	2.00–1.2	42.2
After G's practice period	2.1	23	3.2–1.2	2.03	3.07–1.6	60.0
Gain	.5	23		.43		17.8

TABLE XI

SUMMARY OF ORAL- AND SILENT-READING RECORDS FOR CASE G

	ORAL READING			SILENT READING		
	Rate	Range	Errors	Rate	Range	Percentage Correct
Before practice	1.95	3.2–1.1	37	1.4	2.9–0.9	63.3
After practice	2.58	4.8–1.3	14	3.9	5.3–3.1	81.5
Gain	.63		23	2.5		18.2

Her teachers report that Case G reads with much greater ease and fluency of expression. The quality of her voice has improved and the nasal tones have almost disappeared. She seems to enjoy reading silently much more than before training. Frequently she expresses a preference for reading a passage silently, saying.

"I can do it faster." Her oral reproductions contain many more of the expressions found in the original passage than formerly. When told that her written work does not include many new words, she said, "Well, I remember them, but I am not always absolutely sure of the spelling, so I use a word that means the same." She ranks among the upper third of her class in ability to read rapidly when reading for the purpose of reproducing the thought.

At the end of the eighteen weeks of training a series of photographs was taken of the eye-movements of Case G during silent reading. The record is presented in Plate XL.

This record might be discouraging if it were not preceded by the record shown in Plate XXXIX. Contrasted with the earlier record this shows great progress. There are, indeed, regressive movements and spots of confusion, but there are also regions where a new type of mastery of the lines begins to appear. The fifth line, for example, is a fairly good line. Even where confusion appears the child seems to be able to extricate herself. The confusion is not so utter as it was in Plate XXXIX.

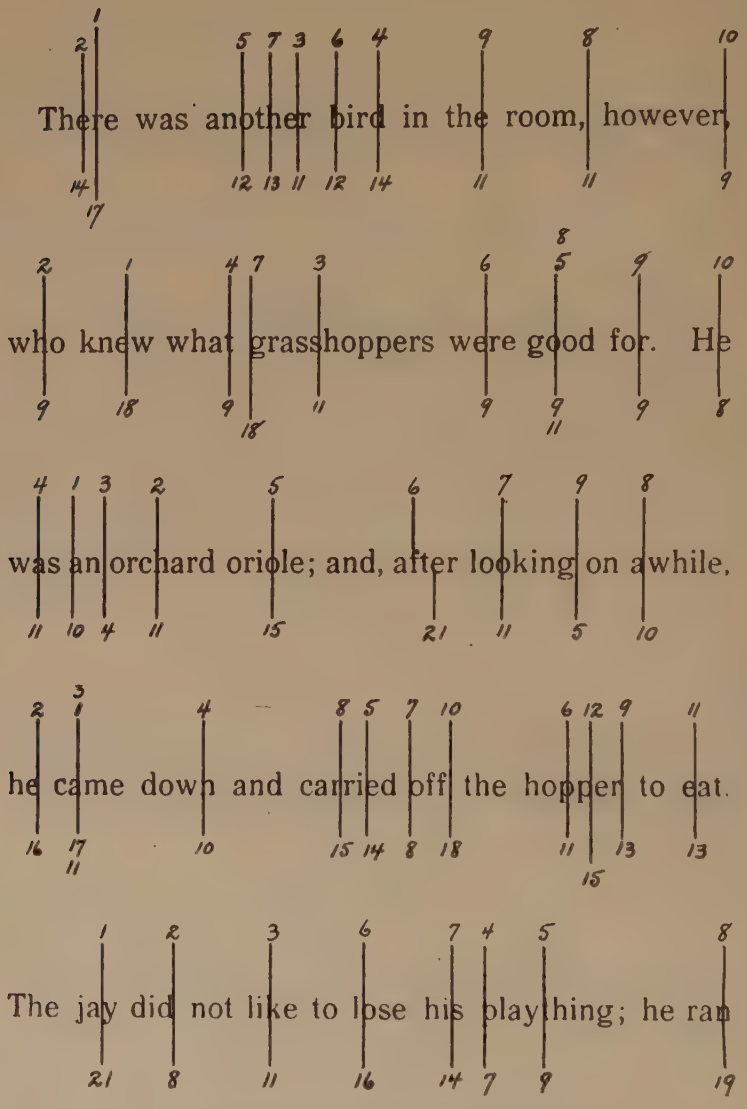
CASE H IN THE FOURTH GRADE

Case H is a boy nine years and four months old and in the beginning fourth grade in November, 1916, when the training began. Unfortunately it is not possible to report this case in full because he was suddenly withdrawn from school by the removal of the family to another state. The training did not prove as effective in this case as in the preceding.

The photographic record taken earlier in 1916 (Plate XLI) shows a bad case of laborious and confused eye-movements. It is not necessary to offer detailed comments. It is the companion of the record shown for Case G in Plate XXXIX.

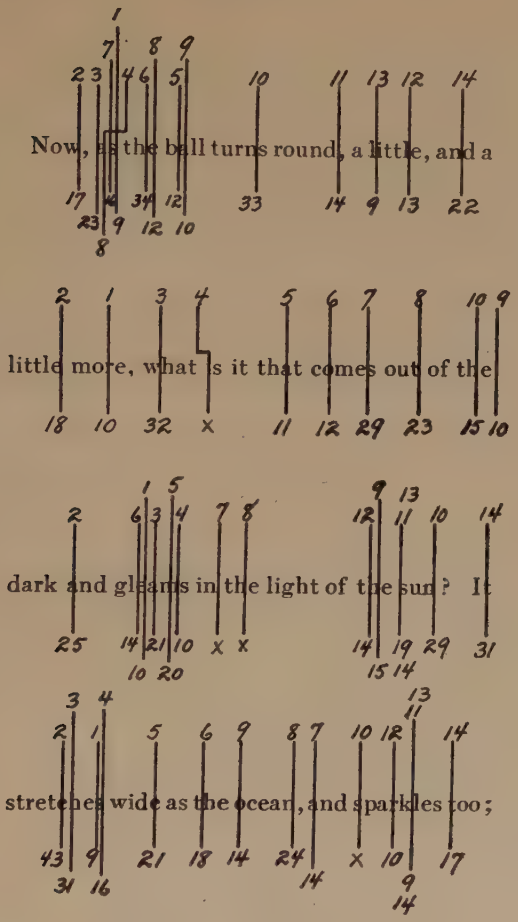
The boy H entered Grade I B in October, 1913, and completed a grade each year. His attendance throughout his school course has been very irregular. He has an aggregate absence of one hundred and eight days, or 21 per cent of the entire school time. Furthermore, eighty days of absence occurred in the first grade. The school physician's record shows that for the most part his

PLATE XL


There was another bird in the room, however,
who knew what grasshoppers were good for. He
was an orchard oriole; and, after looking on awhile,
he came down and carried off the hopper to eat.
The jay did not like to lose his plaything; he ran

Silent reading of Pupil G after special training

PLATE XLI


Now, as the ball turns round, a little, and a
little more, what is it that comes out of the
dark and gleams in the light of the sun? It
stretches wide as the ocean, and sparkles too;

Silent reading of Pupil H before special training (Subject No. 1 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

absences were caused by the usual children's diseases: colds, inflamed tonsils, adenoids, and by exclusion on account of contact with contagious disease. After his adenoids and tonsils were removed in 1915 his attendance became somewhat more regular. His eyes and ears were normal. The foregoing facts are significant and should be borne in mind in a diagnosis of his reading difficulties.

Despite the frequent interruptions, however, he has apparently maintained a fair average in general school work other than reading, spelling, and mathematics. In these he is graded poor (C or D). His best work is done in the manual arts and in natural science. In the latter subject he is keenly interested, takes an active part in the work, and frequently adds to the class discussions facts and ideas he has gained from contact with his father's science collections.

Though he has apparently considerable native ability, he is classed as the poorest reader of his grade. He gains but few ideas from a selection read either orally or silently. His oral reading is done in a high unnatural tone of voice, and is mechanical, labored, and expressionless. As he reads he sways his head from side to side in rhythmical motion and follows the line of the page with his finger. While he thus keeps the place he occasionally omits words or a whole line and continues, oblivious of the omission, showing clearly that the thought in the selection has little to do with his reading. While these omissions are conspicuous his dominant errors are mispronunciations and repetitions.

Tests were given in an effort to ascertain some of the causes of his apparent deficiency in reading. In the oral-reading tests the time for the first seven paragraphs was 4:51, or an average rate of 1.4 words per second and a range of 2.5 to 0.8 words per second. Yet his rate of vocalization as shown by counting was 7.3 monosyllables per second. His slow rate in reading was not due to inability to speak rapidly. The record for accuracy showed a total of 55 errors, or a rate of 14 per hundred words. The conspicuous facts in this record were the 31 repetitions and the 17 mispronunciations that made up 88 per cent of the total. Repetitions were often made after a mispronunciation or before a word of two or three syllables. If a word was mispronounced he repeated

the phrase, trying another pronunciation equally incorrect, and proceeded with the reading even though his reading of the sentence made no sense.

In the silent-reading tests for rate and comprehension he read the first seven selections in 3:48. This gives an average slightly above the oral rate. The silent rate is accordingly 1.8 words per second with a range of 3.1 to 1.3. There was much vocalization, and unfamiliar words were spelled out letter by letter. The quality score for comprehension appears in Table XII.

TABLE XII

SILENT-READING RECORD OF CASE H BEFORE SPECIAL TRAINING

	Rate	Range	Percentage Correct
Reading for questions	1.8	3.1–1.3	44.2
Reading for reproduction	1.6	2.1–1.2	37.2
Reading for speed	2.0	2.9–1.7	37.7

As in the oral reading the rate is very low. In the test for span of attention he averages but 0.7 of a word, an indication probably that he reads words a letter at a time. The photographic record of eye-movements shows an average of 13.8 pauses to a line and .38 second for the average length of the pauses. These facts taken in conjunction with the rate in oral and silent reading warrant the assumption that he reads by the alphabet method. Indeed, he verified this statement by remarking, "I spell out any word I don't know, but I know the ones I've spelled out a lot of times." It is not surprising that with such a procedure he should achieve a low score in comprehension.

To teach him to read phonetically was the purpose of much of the training attempted. During the first six weeks much oral reading and phonic analysis with a few minutes of silent reading constituted the daily program. Easy selections from the Merrill, Horace Mann, the Aldine, and Free and Treadwell readers and the *Child Classics* were used extensively. Attention was focused on thought-getting. At first even in the simplest selections where the meaning of each word was understood the pupil read words as

unconnected ideas, not recognizing the larger thought of which they were only a part. Furthermore, after the meaning of a sentence was grasped, he read each sentence as though it had no relation to the ones before and after it.

A method of phonetic analysis was built up, using modifications of both the Beacon and the Aldine systems. Lists containing words phonetically learned were used in frequent reviews. All new words met in oral reading were sounded phonetically and never spelled by letters. This work was continued during the remainder of the training period though less intensively.

A daily record was kept of rate and errors. No allowance has been made for the varying degrees of difficulty characterizing the numerous selections, and for that reason the results obtained from Gray's standardized paragraphs give a more accurate basis for comparison. One further word of explanation should be added. During the latter part of the second six weeks of practice the pupil met with an accident on the playground in which his front teeth were broken off. This handicap not only lowered the rate but increased the number of errors.

TABLE XIII

ORAL-READING RECORD OF CASE H DURING PERIOD OF SPECIAL TRAINING

	Rate	Range	Errors per 100 Words
First six weeks	2.1	3.0–1.8	6
Second six weeks	1.9	2.5–1.6	3

During the second six weeks and before the accident spoken of above the oral tests given before practice began were repeated. The results are given in Table XIV.

The test shows that, while the speed had almost doubled, the number of errors had decreased more than threefold from 14 to 4.5 errors per hundred words. He read with much greater ease and confidence, grouping thought units fairly well, especially in the first five selections. He mispronounced but three words: "Jakie," "evident," and "contrast." A comparison of the types

of errors in the earlier and later readings indicates clearly the lines of progress.

TABLE XIV

ORAL-READING RECORDS FOR CASE H BEFORE AND AFTER TRAINING

SELECTION	BEFORE PRACTICE			AFTER PRACTICE		
	Time	Rate	Errors	Time	Rate	Errors
1.....	19.0	2.52	2	11.0	4.36	1
2.....	22.8	2.14	4	12.0	4.08	2
3.....	26.8	2.23	3	17.2	3.52	2
5.....	54.6	1.13	11	35.8	1.74	5
6.....	59.0	1.05	13	27.0	2.20	1
7.....	67.4	0.80	14	31.0	2.00	4
Total...	249.6		47	134.0		15

Total number of words read, 334. Rate for all passages before practice, 1.33; after practice, 2.57.

TABLE XV

ERRORS IN ORAL READING OF PUPIL H BEFORE AND AFTER TRAINING

	Before Practice	After Practice
Mispronunciations	15	3
Repetitions	27	5
Omissions	3	2
Substitutions and insertions	2	5
Total	47	15

The training in oral reading was accompanied by training in silent reading. While there were a few minutes of silent reading in each lesson during the first six weeks silent reading was not emphasized especially until the second period. It was then continued into the third period for two weeks, at the end of which time the boy moved from the city. For this reason it was not possible to complete the records for this phase of the work.

The material used in silent reading was taken from the readers mentioned above. The selections used at first were those predominantly narrative in character; later the informational type was used extensively. Interest in the story strongly motivated the reading. Often when interrupted by the close of the lesson he would say, "Wait just a minute until I see what happened next."

Oral or written reproduction usually followed the reading. The quality of the two types of reproduction stood out in marked contrast. The oral reproductions were given in an animated, dramatic manner; details were readily recalled and words flowed freely; but before he could get many ideas on paper the inspiration of the selection had fled, leaving but a shadow of the narrative in a few disjointed sentences inadequately expressed.

The daily record for speed shows an average of 2.1 for the first period and 3.3 for the two weeks of the second period, and the corresponding quality scores in comprehension are 26 per cent and 35 per cent. As has been said above, it is difficult to make a comparison of the amount of progress made unless the material is of the same degree of difficulty. However, it seems fair to say that both the rate and comprehension scores, since they were for the most part made with material more difficult than that used in the first six weeks, represent a gain.

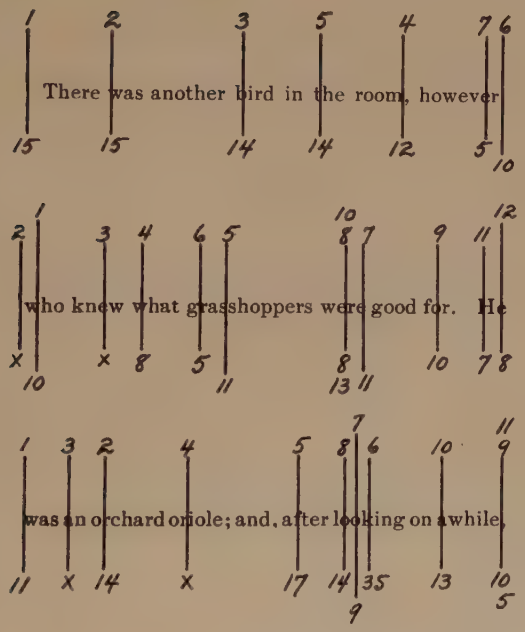
The improvement indicated by these tests is relatively small. How far it was due to general grade training and how far to special training is difficult to say. As stated in the paragraph at the beginning of the description of this case, the boy left the school without notice, and there was no possibility of finishing the tests or of securing a photographic record.

CASE M IN THE SIXTH GRADE

The third case differs radically in character from those described thus far. The difference is apparent at once from the photographic record which preceded the training. This record is presented in Plate XLII. The most striking complications in this record are those which appear in the long regressive movements occurring in every line. Line 1 shows such a movement between pauses 4 and 5; line 2, between pauses 9 and 10; line 3, between pauses 9 and 10. Otherwise the record looks like that of a fair but immature reader.

M is a boy who was eleven years and ten months old and in the sixth grade when training began in November, 1916. He had attended the Chicago public schools for three years prior to his entrance into Grade IV B of the University Elementary

PLATE XLII


There was another bird in the room, however
who knew what grasshoppers were good for. He
was an orchard oriole; and, after looking on awhile,

Silent reading of Pupil M before special training (Subject No. 19 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

School in October, 1914. The school physician's records contain the following statements about his general physical condition: (*a*) Chronic catarrhal inflammation of throat and nasal passages. (*b*) Broken down arches, indicative of poor general physical condition. (*c*) Farsighted in left eye; wears glasses. (*d*) Very nervous. (*e*) Absent seven days in two years. In general school standing he is rated as a poor student. He has received C or D in all subjects except physical training and the manual arts. In the latter he ranks as C+ or B. He has never been rated above C− in reading. His teachers report him as a nervous, restless boy who seems unable to concentrate for any length of time. He is a poor reader who comprehends little of the passages read silently and not much more when he reads aloud. He apparently does not follow the page as others read aloud, yet he frequently can give a fairly full reproduction of the paragraph or selection read. He intensely dislikes to read aloud and will by artfully raising a question for discussion dodge the ordeal whenever possible.

The report from the home confirms these observations at school. His mother says that he rarely ever reads at home even though he has many opportunities to do so. He is much interested in baseball and football, but he never reads the accounts of the games if he can inveigle his older brother into reading to him. He enjoys having others read to him, and this his father has done evenings for years.

The same tests were given as in the preceding cases. A comparison of the oral- and silent-reading rates showed his range to be 3.1 to 0.7 words per second for oral reading and 2.9 to 1.2 for silent reading. Of the errors made in oral reading 67 per cent were mispronunciations and 21 per cent were repetitions of words or phrases. In the tests for comprehension his averages were low.

TABLE XVI

ABILITY OF PUPIL M TO REPRODUCE AFTER SILENT READING

Reading for questions	56.7 per cent
Reading for reproduction	40.5 per cent
Reading for speed	9.6 per cent

When allowed to read at his own rate he is able to glean about one-half of the ideas of the selection, but when his pace is speeded up he understands very little of what he reads.

How to increase his power of word recognition and overcome his aversion to reading became the important problems in the eighteen weeks of training. Silent reading was included in the training throughout the eighteen weeks in an effort to cultivate his interest in reading. During one six-week period, however, word analysis was stressed, while for another period oral exercises were given.

The word analysis was both phonic and interpretative. For the first two weeks phonics were studied exclusively, but little interest was aroused. The pupil was nervous and inattentive, and finally naïvely explained the difficulty by remarking, "My sister studies these things in the second grade." When asked if he ever had, he replied, "Oh, they had them when I was in the lower grades, but I never learned them." The phonic work was continued but made to include the study of prefixes, suffixes, and stems of words. This aroused his interest to such an extent that he brought in from time to time long lists of words containing the stem or prefix studied. Usually the words were taken from the silent reading of the preceding lessons and included those that were unfamiliar. Lists of words having the same prefix, stem, or suffix were written out and grouped into "families." The dictionary was consulted when there was any doubt about the pronunciation; the words were then marked diacritically and sounded phonetically. After an analysis of the meaning of a new word from the text and from its stem, prefix, or suffix, the dictionary was consulted to verify the inferred meaning. The work was kept as simple as possible and included only the most common prefixes, suffixes, and stems, as

un, con, dis, ex, re, sub, ante, trans
er, ar, or and ant, able, ish, ment, ing, ize, age
port, spect, tract, dict, ced, cred, loc, fact

During the second six weeks oral reading was emphasized and was continued, though less intensively, throughout the last period of six weeks. Some of the selections read silently during the previous period were now read orally; these were soon replaced by new

ones when the interest lagged. Easy prose narratives were selected from the Merrill *Third* and *Fourth Readers* and from the Horace Mann *Third* and *Fourth Readers*. Toward the end of the twelve weeks the fifth readers of these series were used extensively. Daily records were kept of the rate and errors, and though it is impossible to make any accurate comparisons because of the varying degrees of difficulty in the selections it is interesting to note in Table XVII that there is a distinct gain in rate over the record made before practice, and, further, the number of errors per hundred words shows a distinct decline.

TABLE XVII

ORAL-READING RECORD OF PUPIL M DURING PERIOD OF SPECIAL TRAINING

	Rate	Errors per 100 Words
Before practice	1.40	8.0
During six weeks	2.68	1.9
After six weeks	2.62	1.8

More accurate evidence of progress was obtained at the end of the training period in May. The oral test given before training began was repeated. The time for reading each of the paragraphs had been lowered in every instance and the number of errors reduced 65 per cent. The range in the first record is from 3.1 to 0.7 words per second, while that on the latter is 5.7 to 2.6. The most notable gain was made in rate. The time was reduced from 360.6 seconds to 139.2 seconds, a gain of 221.4 seconds, making an average rate of 3.8 words per second for the ten selections read.

It may be argued, and rightly, that a part of this growth is the result of the regular school work. To approximate the amount a comparison was made with another poor reader, a girl, in the same grade. She is rated by her teachers as slightly better than Case M.

M's training in silent reading was continued throughout the period of eighteen weeks but was especially emphasized during the last six weeks. The material, as with Case G, was chosen along the lines of the pupil's school interests and included Southworth's *Builders of Our Country*, Books I and II, Baldwin's *Conquest of*

the Northwest Territory (first six weeks), *Merrill Readers*, Books III, IV, and V, and *Horace Mann Readers*, Books III, IV, and V (second

TABLE XVIII

ORAL-READING RECORDS FOR CASE M BEFORE AND AFTER SPECIAL TRAINING

SELECTION	BEFORE PRACTICE		AFTER PRACTICE	
	Time	Errors	Time	Errors
1	15.6	1	9.0	1
2	16.0	1	12.0	1
3	26.8	3	13.0	1
4	20.0	1	13.6	0
5	24.8	2	10.8	1
7	30.4	4	15.0	0
8	59.0	9	17.0	2
9	41.0	5	14.8	1
10	62.0	7	16.0	4
11	65.0	8	18.0	3
Total	360.6	41	139.2	14

Total number of words read, 531. Rate for all passages before practice, 1.47; after practice, 3.83.

TABLE XIX

ORAL-READING RECORDS FOR CHECK CASE COMPARED WITH PUPIL M

SELECTION	BEFORE PERIOD OF M'S TRAINING		AFTER PERIOD OF M'S TRAINING	
	Time	Errors	Time	Errors
1	15.2	1	11.8	0
2	23.4	1	16.2	1
3	20.0	1	17.8	2
4	25.0	0	17.2	0
5	24.0	2	16.8	1
7	31.0	5	18.8	1
8	56.2	10	22.0	1
9	55.0	3	30.4	7
10	60.0	8	41.2	6
11	71.0	10	34.0	5
Total	380.8	41	226.2	24

Total number of words read, 531. Rate for all passages before practice, 1.39; after practice, 2.34.

six weeks), and Thwaites's *Daniel Boone* (third six weeks). As Thwaites's *Daniel Boone* proved too difficult for this particular

pupil the first four or five chapters were edited by working over the long, involved sentences and by omitting some of the most difficult words and weaving in words familiar to the student. The later chapters, however, were read unmodified.

Silent reading was followed by oral or written reproduction. When the oral reproductions were inadequate questions were asked and the pupil, if unable to answer, re-read the paragraph. After a chapter had been studied in this way a résumé was made of the main points. A record was kept of the rate and comprehension for the material read, but the varying degree of difficulty of the selections makes a comparison of little value.

TABLE XX

SILENT-READING RECORD OF PUPIL M DURING PERIOD OF SPECIAL TRAINING

	First Period Easy Reading	Second Period Medium Reading	Third Period Difficult Reading
Rate.....	3.4	3.7	3.7
Range.....	4.6–2.6	4.8–2.6	5.8–3.1

There was an increase in comprehension from 7 per cent for the first period to 42 per cent for the second period and 73 per cent for the third period. The percentage of gain is difficult to estimate, as most of the reading dealt with the theme of exploration and colonization and each story served to build up a background which gave the student a distinct advantage in later reproductions.

The silent-reading tests given before practice were repeated and the comparisons of rate and comprehension can be made from Table XXI.

The summary of all the silent-reading records indicates that the increase in rate has been accompanied by a corresponding increase in comprehension. Case M has raised his rate from 1.7 to 3.2 words per second and, furthermore, is able at this higher rate to achieve a much more satisfactory comprehension score.

The summary of M's check case in Table XXIII reveals gains in comprehension but slight gains in rate. This pupil continues apparently to read silently at her oral-reading rate. In the speed

test she is unable to maintain even this rate and reproduces fewer ideas than did Case M.

TABLE XXI

SILENT-READING RECORDS WITH QUESTIONS FOR CASE M

SELECTION	BEFORE PRACTICE			AFTER PRACTICE		
	Time	Rate	Percentage Correct	Time	Rate	Percentage Correct
1	24.0	1.66	60	7.0	5.70	80
2	16.6	2.89	100	11.0	4.40	100
3	30.0	1.80	70	15.0	3.60	80
4	35.0	1.97	70	17.0	4.05	100
5	41.0	1.90	100	22.6	3.40	100
6	43.0	1.51	70	20.0	3.25	80
7	51.0	1.20	20	20.4	3.00	30
8	44.0	1.34	0	25.0	2.36	60
9	45.0	1.45	20	40.0	2.20	20
Total	329.6			178.0		

Total number of words read, 563. Rate for all passages before practice, 1.7; after practice, 3.2. Percentage correct for all passages before practice, 56.6; after practice, 72.2.

TABLE XXII

SUMMARY OF SILENT-READING RECORDS FOR CASE M BEFORE AND AFTER SPECIAL TRAINING

	BEFORE PRACTICE			AFTER PRACTICE		
	Rate	Range	Percentage Correct	Rate	Range	Percentage Correct
Questions	1.70	2.9–1.2	56.6	3.20	5.7–2.2	72.2
Reproduction	1.88	1.9–1.7	40.5	3.32	3.7–3.2	53.8
Speed	3.63	3.9–3.4	9.6	3.34	3.5–3.2	43.7

TABLE XXIII

SUMMARY OF SILENT-READING RECORDS FOR CHECK CASE COMPARED WITH CASE M

	BEFORE PRACTICE			AFTER PRACTICE		
	Rate	Range	Percentage Correct	Rate	Range	Percentage Correct
Questions	1.79	3.0–1.2	52.2	2.09	3.7–1.6	71.1
Reproduction	2.07	2.0–1.7	21.7	2.54	2.9–2.3	40.0
Speed	3.10	3.9–2.3	8.9	1.87	2.0–1.7	29.6

At the end of training Pupil M seems more interested in reading, especially in silent reading, though it is difficult for him to hold his

attention on a single problem for more than a few minutes at a time.

Two photographic records, which were taken at the end of the period of training, are shown in Plates XLIII and XLIV. They exhibit a reduction of the long regressive movements characteristic of the record taken before training. There are regressive movements at the beginnings of the lines and scattered through the record as in Plate XLIII, line 2, pauses 4–5; line 4, pauses 3–4; line 5, pauses 5–6; and in Plate XLIV, line 2, pauses 2–3; line 3, pauses 4–5; line 5, pauses 8–9; but some of these regressive movements are short, and there appears to be some improvement when these records are compared with the earlier photograph (Plate XLII).

The record is by no means one which indicates a high degree of reading ability, but it is evident that the boy's method of attacking the problem of reading is better than before training.

CASE E IN THE SEVENTH GRADE

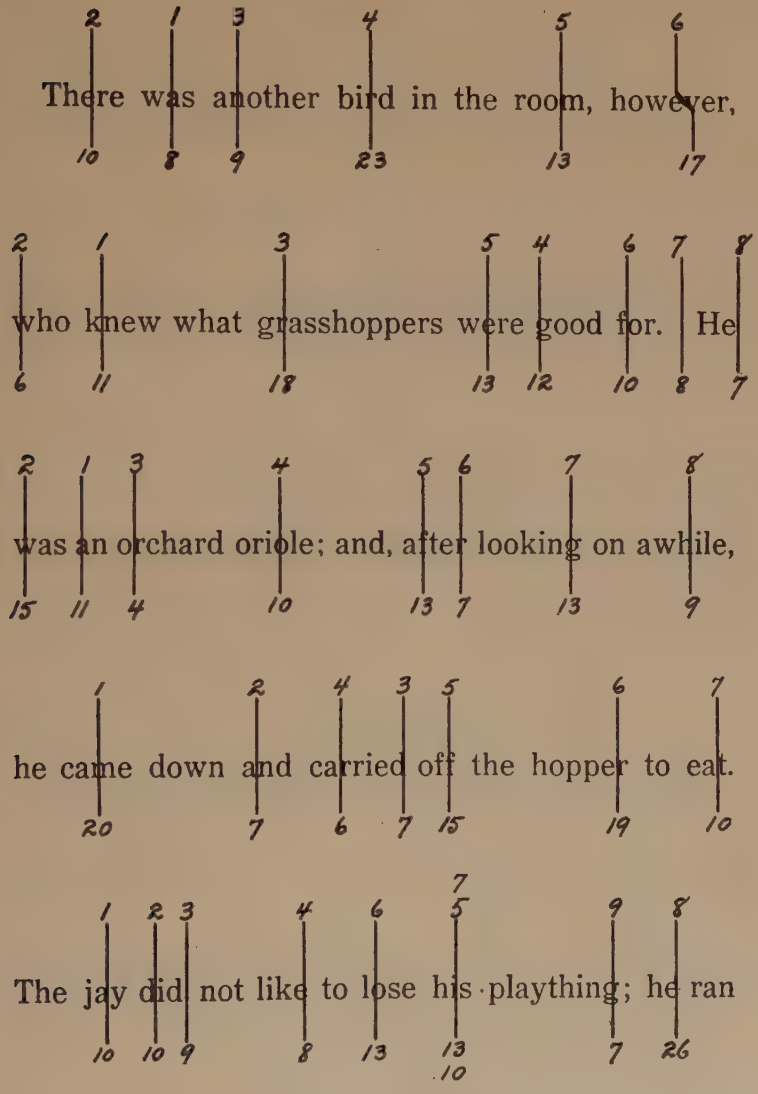
Case E is that of a boy who was fourteen years and ten months old and in the seventh grade when training began. The photographic record of his reading before practice is given in Plate XLV. The record shows a number of regressive movements and more pauses than usual for pupils of this grade.

Case E entered the first grade of the University Elementary School at the age of eight, was withdrawn for a half year at the end of Grade III B, returned to the school in Grade IV B, repeated Grade V A, completed Grade VI in one year, and entered Grade VII B in October, 1916.

The school physician's report shows his general health as fair and attendance somewhat irregular. His tonsils and adenoids have been removed. His hearing is dull, especially so in the left ear.

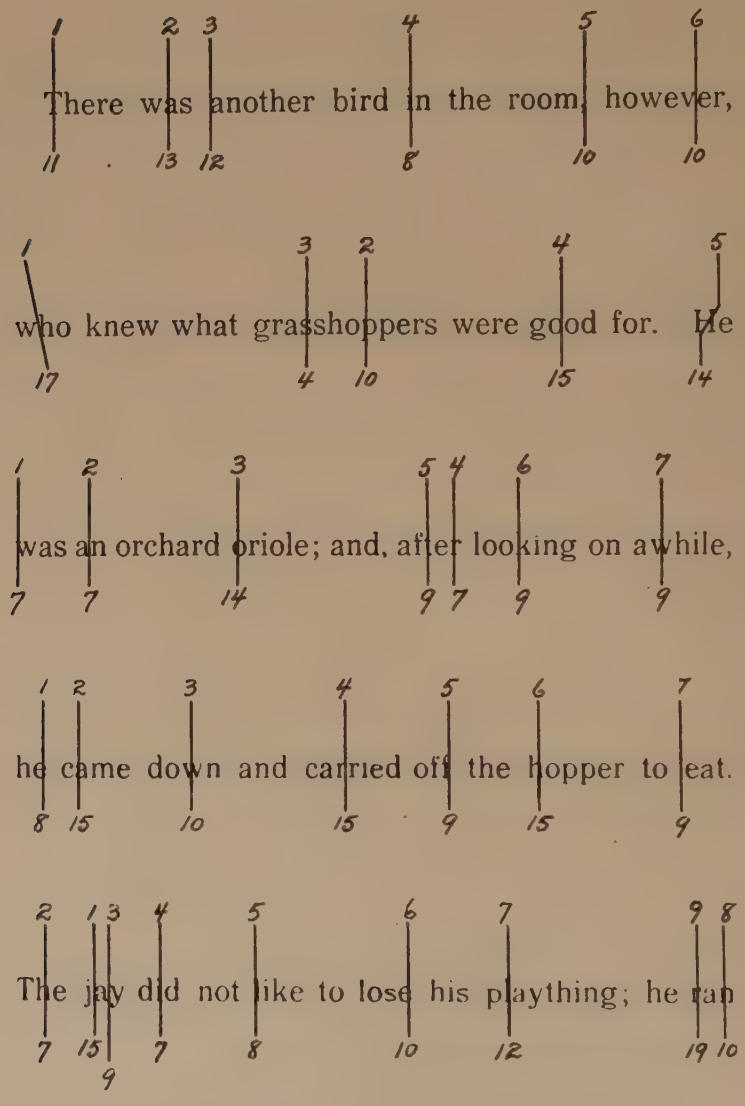
In general school standing he is rated as a poor student, although he is given a grade of good (B) in the manual arts, music, and physical training. In all other subjects he is poor. During the past two and a half years he has received no grade higher than C in history, geography, science, literature, composition, and grammar. In this connection it is interesting to note that progress in

PLATE XLIII

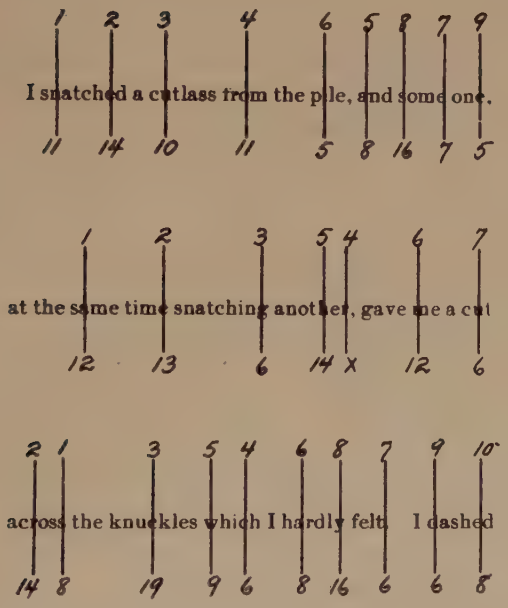

There was another bird in the room, however,
who knew what grasshoppers were good for. He
was an orchard oriole; and, after looking on awhile,
he came down and carried off the hopper to eat.
The jay did not like to lose his plaything; he ran

Silent reading of Pupil M after special training

PLATE XLIV


There was another bird in the room, however,
who knew what grasshoppers were good for. He
was an orchard oriole; and, after looking on awhile,
he came down and carried off the hopper to eat.
The jay did not like to lose his plaything; he ran

Second silent reading of Pupil M after special training

PLATE XLV

1 2 3 4 6 5 8 7 9
I snatched a cutlass from the pile, and some one,
11 14 10 11 5 8 16 7 5
1 2 3 5 4 6 7
at the same time snatching another, gave me a cut
12 13 6 14 X 12 6
2 1 3 5 4 6 8 7 9 10
across the knuckles which I hardly felt. I dashed
14 8 19 9 6 8 16 6 6 8

Silent reading of Pupil E before special training (Subject No. 28 in C. T. Gray's tables). × indicates that it was impossible to determine with precision the length of the pause.

these subjects after the fourth grade is dependent to a large degree on ability to get thought from the printed page.

His teachers report him as a shy, timid boy, easily embarrassed, lacking in self-confidence and initiative in the classroom, though very energetic and responsive on the athletic field. He rarely takes part voluntarily in class discussions, and when called on to do so responds in a few brief fragmentary sentences, badly expressed, but usually containing a thought or an idea on the topic being considered. His English teacher finds great difficulty in getting him to read with any degree of expression, for he makes no attempt to group words into thought units. He reads in a dull, monotonous tone, slurring words and phrases. When asked to tell what he has read, he reproduces a few ideas in short, scrappy sentences, for apparently he makes few associations as he reads. His teachers in history and geography explain his poor standing in their subjects as attributable to an inability to get ideas from the text. He apparently reads as rapidly silently as any in the class but gets and retains less of the thought.

The tests in oral and silent reading sustained the opinions given by his teachers. In the oral test he read fairly rapidly, pronouncing the words mechanically and enunciating poorly. Several periods were eliminated and two adjoining sentences were read as single thoughts. The record in rate for the twelve paragraphs read shows a general average of 2.4 words per second with a range of 3.8 to 0.9. The distribution of the total of twenty-two errors is given in Table XXIV.

TABLE XXIV

ERRORS MADE BY PUPIL E IN ORAL READING BEFORE SPECIAL TRAINING

Mispronunciations	19
Repetitions	1
Omissions	2

Twelve of the mispronunciations were made in the last two paragraphs of the series and included such uncommon words as "hypothesis," "statistician," "archaeological," and "physicist." Unlike the other cases previously described he made few repetitions,

probably because he readily recognizes word forms in common use and also possibly because he makes so few associations that he is not constrained to repeat a phrase from any new idea that would cause him to go back for a different grouping of the thought unit.

The test in silent reading defined more clearly his apparent difficulties. The record for the three types of tests given is presented in Table XXV. His average score for the three tests in

TABLE XXV

SILENT-READING RECORD OF PUPIL E BEFORE SPECIAL TRAINING

	Rate	Range	Percentage Correct
Reading for questions	1.75	3.7–1.3	57.8
Reading for reproduction	1.67	1.8–1.5	26.0
Reading for speed	2.60	3.8–2.3	9.6

comprehension is but 31.1 per cent while that for Case G, the fifth-grade girl, was 36.9 per cent, and that for Case M, the sixth-grade boy, was 35.6. Clearly this particular seventh-grade boy ranks in comprehension at a lower level than the poorest readers in the two preceding grades. This result verifies the estimates of his teachers of history and geography.

A résumé of the facts brought out by the tests would seem to indicate that he had acquired a mastery of the rudimentary mechanics of word recognition but lagged far behind in the mastery of word meaning. He read words as mere names and not as symbols of ideas.

How to build up a background of meaning that would form a basis for his reading was and still is an urgent and difficult problem. Because of his interest in animal stories and tales of camp and pioneer life emphasis was laid throughout the eighteen weeks on literature dealing with these topics. *The Boy Scouts' Manual*, Custer's *Boots and Saddles*, Roosevelt's *Winning of the West*, Southworth's *Builders of Our Country*, Book II, the Merrill and the Horace Mann *Fourth* and *Fifth Readers*, Burrough's *Stickeen*, Coffin's *Boys of '76*, the Seton Thompson and Kipling stories, and similar literature were drawn upon freely. Silent reading was

continued throughout the eighteen weeks, but was especially emphasized during the first six weeks and again during the last six weeks. After reading a selection the pupil reproduced it orally or in writing. These reproductions at first were so meager and inadequate that he frequently had to re-read several times before he could answer the questions raised. Many selections were read in this way paragraph by paragraph and the main points jotted down to assist in the organization of the thought.

Before the work had progressed very far it became apparent that definite word study was necessary in order to build up a background of meaning. Words were studied in the context for meaning, and certain ones were chosen for detailed analysis of prefix, suffix, and stem. A stem word analyzed in this manner became the nucleus for grouping together other closely related words more or less familiar to the student. The word "traction" encountered in an article on the "Lincoln Highway" brought out a discussion of traction engines, their use in plowing, road-building, and trench warfare, why so called, etc. This centered attention upon the stem "tract." As its meaning became clear the following list was elaborated:

subtract	distract	attraction
contract	extract	distraction
detract	retract	subtraction
attract	contraction	extraction

A study of the prefixes in these words gave a point of leverage for attacking the meaning of words containing them. In this type of prefix study only those words were listed whose stems were familiar to the pupil, as, for example:

recall	rebound	retake
reclaim	retain	reinforce
rearrange	reform	return
regain	remake	reframe, etc.

In a similar manner an acquaintance was made with the most common suffixes.

The meaning of some words was approached by the study of synonyms and equivalent idiomatic phrases. These were, as far as possible, studied in the context and discussed at length to bring

out shades of difference in meaning. "An indomitable hero" met in the pioneer tales brought forth the following synonyms and idiomatic phrases:

indomitable	fearless	stout-hearted
brave	heroic	intrepid
courageous	bold	audacious
resolute	daring	defiant
manly	plucky	undismayed

to look danger in the face
to screw one's courage to the sticking-point
to take the bull by the horns
to beard the lion in his den
to put on a bold front

This type of intensive word study was continued throughout the first six weeks but was supplemented by incidental word study during the remaining twelve weeks.

Oral reading was given special attention during the second six weeks and continued during the following six seeks. The literature was of the same general type as that used in silent reading. The purpose was to improve, if possible, enunciation and expression. Special drills in the enunciation of vowels and of the terminal and initial consonants were a part of each reading lesson. Many of these drills were taken from reading books. Selections were studied silently before being read aloud and the meaning discussed. The various thought units were marked off and the whole selection was then read aloud. Before the close of each lesson the pupil read a selection at sight, unaided by this kind of preparation. The record was kept of this oral reading, showing the results given in Table XXVI.

TABLE XXVI

ORAL-READING RECORD OF PUPIL E DURING PERIOD OF SPECIAL TRAINING

	Rate	Range	Errors per 100 Words
First six weeks	2.96	3.5–2.4	.8
Second six weeks	2.99	3.9–2.4	.5

While these records show little gain in rate or reduction of errors, there was a distinct improvement in tone quality, enunciation, and

expression. While some of his difficulty in enunciation is probably due to his lack of acuity of hearing, yet doubtless his inability to grasp the thought as he reads is a more important part of the difficulty.

As in the other cases described, the oral and silent tests given before practice were repeated. The results appear in Table XXVII.

TABLE XXVII

ORAL-READING RECORDS OF CASE E BEFORE AND AFTER SPECIAL TRAINING

SELECTION	BEFORE PRACTICE		AFTER PRACTICE	
	Time	Errors	Time	Errors
1	17.0	1	12.0	1
2	17.8	0	10.2	0
3	16.2	1	14.6	0
4	16.0	0	14.0	0
5	18.4	1	15.0	1
6	18.2	0	14.0	1
7	20.0	2	16.0	2
8	21.2	1	19.0	0
9	22.0	2	17.0	0
10	29.0	2	24.0	2
11	29.0	6	23.0	3
12	40.4	6	28.0	1
Total	265.2	22	206.8	11

Total number of words read, 631. Rate for all passages before practice, 2.37; after practice, 3.1.

There is a 50 per cent reduction in errors and a gain in rate. In looking over the type of errors made it is interesting to note that only three of the twelve words mispronounced in the last two paragraphs in the first test were mispronounced in the second test. Furthermore, with the exception of two repetitions, all other errors in the second test were substitutions or omissions which did not materially change the meaning of the passage. An increase in rate was made despite the fact that the words were more clearly enunciated than before training.

A comparison was made with another poor reader in the same grade to determine the net gain or loss in the year's work. The record for this second reader who had no special training is given in Table XXVIII.

From the following record it is easily seen that the pupil without special practice made little gain in this type of reading. The explanation is probably to be found in the fact that oral reading is not stressed in the regular work of this grade.

TABLE XXVIII

ORAL-READING RECORD OF CHECK CASE COMPARED WITH CASE E

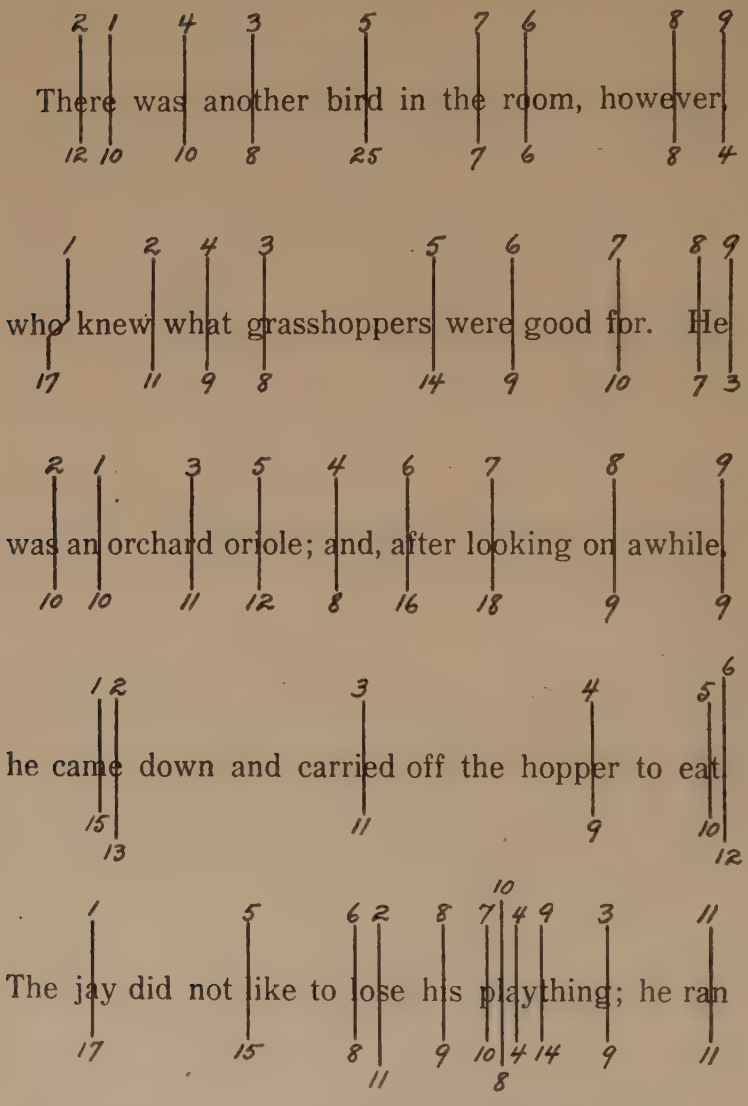
SELECTION	BEFORE PERIOD OF E'S TRAINING		AFTER PERIOD OF E'S TRAINING	
	Time	Errors	Time	Errors
1	13.0	2	12.4	0
2	15.0	0	12.4	1
3	20.0	1	17.2	4
4	19.0	2	15.8	0
5	19.0	2	15.0	1
6	20.8	3	17.6	3
7	20.0	1	21.2	3
8	27.0	6	23.0	3
9	29.4	6	28.6	6
10	34.0	8	32.0	7
11	31.0	10	38.0	5
12	39.0	4	43.8	7
Total	287.2	45	277.0	40

Total number of words read, 631. Rate for all passages before period of E's training, 2.2; after period of E's training, 2.27.

The summary of silent-reading tests with both pupils indicates that greater progress has been made here than in oral reading. This is probably explained by the fact that the regular classroom work encourages this type of reading. A comparison of the records of these two pupils, however, brings out several interesting facts. Case E is evidently establishing a higher rate for silent reading than for oral reading, while the check pupil maintains practically the same rate in both types of reading. The scores for comprehension also indicate striking differences. For example, in the speed test before practice the check pupil's rate and comprehension score were both higher than those of Case E, but in the test after practice the latter pupil has by far the better record. Yet, upon the whole, the comprehension score still leaves Case E below a satisfactory level for his grade.

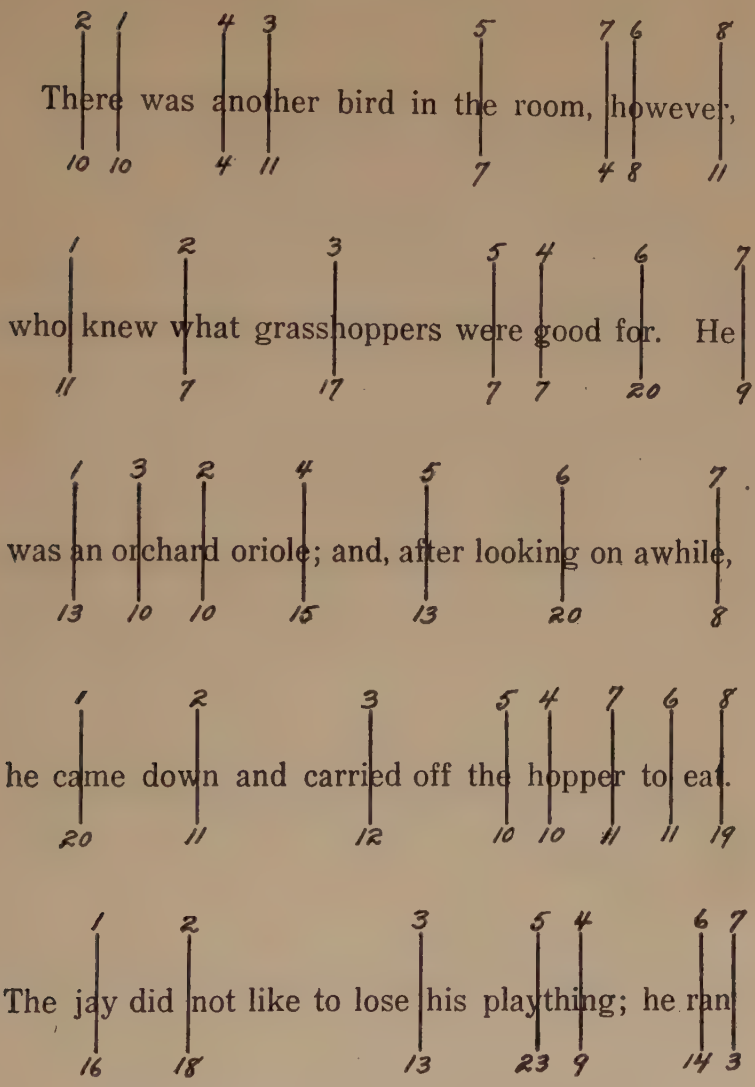
Plates XLVI and XLVII show the records of Pupil E after special training. A comparison of these plates with Plate XLV

PLATE XLVI


There was another bird in the room, however,
who knew what grasshoppers were good for. He
was an orchard oriole; and, after looking on awhile,
he came down and carried off the hopper to eat.
The jay did not like to lose his plaything; he ran

Silent reading of Pupil E after special training

PLATE XLVII


2 1 4 3 5 7 6 8
There was another bird in the room, however,
10 10 4 11 7 4 8 11
1 2 3 5 4 6 7
who knew what grasshoppers were good for. He
11 7 17 7 7 20 9
1 3 2 4 5 6 7
was an orchard oriole; and, after looking on awhile,
13 10 10 15 13 20 8
1 2 3 5 4 7 6 8
he came down and carried off the hopper to eat.
20 11 12 10 10 11 11 19
1 2 3 5 4 6 7
The jay did not like to lose his plaything; he ran
16 18 13 23 9 14 3

Second silent reading of Pupil E after special training

shows that there has been little if any change in the habits of fixation. Indeed, in some of the lines in Plates XLVI and XLVII it would seem that the pupil gives more rather than less attention to details.

TABLE XXIX

SUMMARY OF SILENT-READING RECORD OF CASE E

	Before Practice			After Practice		
	Rate	Range	Percentage Correct	Rate	Range	Percentage Correct
Questions.....	1.75	3.7–1.3	57.8	5.1	6.6–4.4	75.0
Reproduction..	1.67	1.8–1.5	26.0	4.3	4.6–4.2	52.3
Speed.....	2.60	3.8–2.3	9.6	3.9	4.0–3.8	50.3

TABLE XXX

SUMMARY OF SILENT-READING RECORD OF CHECK CASE COMPARED WITH CASE E

	Before Period of E's Training			After Period of E's Training		
	Rate	Range	Percentage Correct	Rate	Range	Percentage Correct
Questions.....	1.59	3.1–1.2	55.5	2.80	3.6–1.9	48.7
Reproduction..	2.29	2.0–1.8	31.9	3.10	3.4–2.8	31.6
Speed.....	2.80	2.9–2.8	15.0	3.03	3.7–2.7	33.0

The training of this pupil has apparently affected the mechanical side of his reading very little. His improvement has been rather in the comprehension of what he reads. It seems proper to infer that training in the upper grades, at least training of the type given in this case, is unlikely to be effective in changing the mechanical habits of pupils.

CHAPTER VI

EXTREME CASES OF PUPILS BACKWARD IN READING

There are certain pupils who are not feeble-minded but are very backward in learning to read. They are probably more numerous in public schools than has been commonly recognized. A study of some cases of this type has been undertaken by Miss Clara Schmitt of the department of child-study of the Chicago public schools. It will serve the purposes of this report to select certain clearly defined cases from the full report which is given in Miss Schmitt's article.[1]

The following account includes in part direct quotations from the article. The cases in question were placed in a special room with a teacher who had given attention to methods of teaching reading. This placement was possible because all these children were attending the same school. In no other instance was more than one such child found in a school, and it was not considered expedient to place the child with subnormal children. In these cases it was felt that no injustice would be done, since most of the members of the room were not definitely subnormal but backward for a variety of reasons.

DIAGNOSIS OF CASES BEFORE SPECIAL TRAINING

The cases, as the descriptions show, were diagnosed with the intelligence tests used by the department of child-study in routine examinations.

Case 1: Boy.—Age eight years and eleven months when first seen in January, 1916. He had then been in the second grade for twenty-six weeks and before that fifty-four weeks in the first grade. Physically he was in good condition—a strong, healthy-looking child. The aunt with whom he and his mother live said that he had typhoid fever at five years and children's diseases in

[1] Clara Schmitt, "Developmental Alexia: Congenital Word-Blindness, or Inability to Learn to Read," *Elementary School Journal*, XVIII (May and June, 1918), 680–700, 757–69.

mild form, but had in general always been a healthy child. In most tests of reasoning and thinking ability he showed himself to be very apt. He did Construction Puzzle B of the Healy-Fernald Series with one error; he failed, however, with the cross-line B. He succeeded with the absurdities test of the Terman ten-year set. He was reported by his teacher as very good in number work and handwork, neat and reliable and diligent. His reading accomplishment consisted of the ability to recognize only a few words, with no knowledge of phonics. He was recommended for the special room.

Case 2: Boy.—Age seven years and three months when first seen in January, 1916. He had been in the first grade for fifty-seven weeks. Physically he was in very good condition, a strong, healthy-looking child. No other member of the family was in school. His teacher reported him as very good in the handwork of the grade. He knew much more number work than was taught in the first grade at that time. His reading accomplishments consisted of the ability to recognize possibly a few words. He counted backward from 10; gave answers to the difference test in good, clear sentences; did the Healy-Fernald Construction Puzzle B with thirteen errors—not a bad record. He did cross-line A at the second attempt; failed with cross-line B. He gave correct answers to five of ten easy opposites, answered three of the other five with the stimulating questions, and did not know the opposite of "truth" and "sad." He did not name the color gray, but called it "light black," and called orange "pink." He was placed in the special room.

Case 3: Girl.—Age ten years and six months when first seen in April, 1915. She had been sixty-nine weeks in the second grade. She had acquired second-grade arithmetic, but her reading was so poor that her teacher desired that she be placed in the special room. Physically she was a plump, well-nourished child, but with hands so moist as to be almost dripping. Along with this she showed a certain amount of nervousness, wriggling and twisting continually. She was nervously inattentive at times, but could at other times, when interested in tests, hold herself down and work out the problem with continuity of attention. A brother of twelve years was very nervous and erratic but not mentally subnormal. He was in the fifth grade and had to repeat half-grades several times, but

then always got through. A sister of fourteen had very poor vision which could not be corrected and was for this reason doing little school work. She did the Construction Puzzle B of the Healy-Fernald Series with no errors and cross-lines A and B at the first attempt. She read Selection A in 3 minutes and 20 seconds with five errors. With the first sentence of Selection B she could not pronounce "Bliss," "manager," "northern," "spectator," "planting," "potatoes." At this time it was the opinion of the examiner that the child's backwardness in school probably was due to nervousness and consequent lack of concentration of attention.

She was seen again in September, 1915, a member of the third grade, and was doing well with the arithmetic and other work of the grade. The reading had not improved. Her teacher said that she had not noticed that her control of attention was poor. She found her always attentive and diligent with the work which was possible for her to do without reading ability.

She was seen again in January, 1916. She was making good progress in the work of the grade. The teacher reported again that the child applied herself well but there was no improvement in reading ability. She was then recommended for residence in the special room.

REVIEW OF SIMILAR CASES IN MEDICAL LITERATURE

Before describing the methods employed in treating these cases it may be more convincing to take into account discussions of like cases which have appeared in medical journals.

Congenital word-blindness, inability to learn to read, or dyslexia has been defined as an extreme difficulty to learn to recognize printed or written language on the part of persons otherwise normally endowed mentally and without defect of vision or other physical defect of such gravity as to constitute an interference of the process of learning to read. "Congenital word-blindness" is the term used by nearly all writers on this condition and for that reason will be used throughout this report.

This condition was first recognized in 1896. It was first referred to by Kerr[1] in the Howard Prize Essay of the Royal Statistical Society. Kerr discussed the needs of school children and

[1] Kerr, Howard Prize Essay, Brit. Royal Statistical Society, 1896.

mentioned that there were children in the schools who had no physical defects and were well endowed as to general mental ability who could not learn to read and were not understood by their instructors. He recommended that they be taught in separate classes.

Morgan,[1] an ophthalmologist, in 1896 reported the case of a boy of fourteen who was brought to him for examination of vision. The boy's parents thought that his inability to learn to read might be due to defect of vision. The vision was found to be perfect, the mentality of the boy to be good, but he confessed that "printed words had no meaning to him." Morgan applied the term "congenital word-blindness" to such cases.

Nearly every year since then one or more persons, mainly ophthalmologists, school physicians, and other medical men, have reported such cases coming to their notice. Several writers have each appeared from time to time with such reports. With but a few exceptions the data advanced in proof of the good general mental ability of the subjects have been convincing. In such cases the subjects were found to be capable of learning the arithmetic and other school subjects not depending upon reading ability, capable of conducting themselves satisfactorily in social ways, and with good memory for poems, songs, etc. One writer tells of a brilliant surgeon who could read almost nothing but acquired all knowledge by ear. Another tells of a congenitally word-blind person who became a successful lawyer, though able to read very little. Most of the cases reported improved with special teaching and with time, some of them to the extent of becoming almost normal in reading ability.

Many writers have discovered a hereditary factor. Thus Stephenson[2] (1907) found six cases affecting three generations of one family. Thomas[3] (1905) and Warburg[4] (1911) found the hereditary factor markedly present in the many cases observed by them.

[1] Morgan, "Congenital Wordblindness," *British Med. Jour.*, 1896.

[2] Stephenson, "Six Cases of Congenital Wordblindness Affecting Three Generations of One Family," *Ophthalmoscope*, 1907.

[3] Thomas, "Congenital Wordblindness," *Ophthalmoscope*, 1905.

[4] Warburg, "Ueber Ageborene Wortblindheit und die Bedeutung für den Unterricht," *Zeit. f. Kinderforschung*, 1911.

THEORIES REGARDING SUCH CASES

The theories advanced as to the etiology of this condition have been derived from the knowledge gained in observation of cases of alexia, or loss of ability to read through disease. In such cases lesions of the left angular gyrus have been found to exist, and this area of the brain has been fixed upon as the center for recording images or memories of printed or written words. Therefore congenital word-blindness is attributed to lack of development of this portion of the brain. Rieger[1] (1909) dissents from this view, maintaining that word-blindness is not related to any particular center of the brain but is only one factor or aspect of low intelligence, that a word-blind person is "idiotic" in that one respect. He proposes to substitute for the term "congenital word-blindness" *partial idiocy in connection with reading of words alone or also of figures*. Rutherford[2] (1910) found a case of word-blindness in a family showing symptoms of degeneration for three generations. Anent this he said, "The condition is thus seen to be of the nature of a reversion to the precivilized type as the result of the loss or destruction of certain of the later and more highly specialized determinants in the gametic idioplasm, and as such it falls in line with many of the phenomena of atavism." Warburg found that the condition existed only among the poor class and that many of the mothers of such children had borne many children, were wage-earners at the same time, and were undernourished. He thought that the defect was a result of this antenatal condition of poor nutrition. McCready[3] (1910), commenting upon the fact that girls constitute a small percentage of the cases, attributes the larger percentage of boys to the fact that the heads of boys are larger at birth than the heads of girls and more liable to injury. He also makes the suggestion that more boys may be reported because the education of boys is more important than that of girls and any interference is more likely to be reported; or that girls attend to their

[1] Rieger, "Die Kongenitale Wortblindheit nach den Berichten von Augenarzten," *Arbeiten aus den Psychiatrischen Klinik zu Wurzburg*, 1909.

[2] Rutherford, "The Etiology of Congenital Word-Blindness," *Brit. Jour. of Children's Diseases*, 1909.

[3] McCready, "Wordblindness as a Cause of Backwardness in School Children," *Penn. Med. Jour.*, 1910.

studies better. Jackson[1] (1906) proposes to substitute the term "developmental alexia." He says, "Spoken language is generally pretty well acquired before the effort to understand and employ its written symbols is commenced. Any lack of co-ordination between visual centers and those already developed to serve the faculties of hearing and speech would cause alexia. . . . . The co-ordinations required for the comprehension and use of language are extremely complex and the failure of these to connect with the visual impressions at any point would be a sufficient explanation of these cases."

EXTENT OF WORD-BLINDNESS AND ITS TREATMENT

The extent of congenital word-blindness was reported upon by Thomas[2] (1905), who as assistant medical officer of the London County Council was able to come into contact with all cases of backward children who were required to be reported to the medical inspectors. He calculated that cases of congenital word-blindness existed to the extent of one in two thousand of the elementary-school population. He found that 25 per cent were girls. Warburg,[3] school physician of Köln, found fourteen among two thousand *Volksschule* children and seven others among four hundred *Hilfsschule* children.

Many of the cases reported in detail improved in ability to read with individual instruction. The reports of these cases go to show for the most part that they learned to read by first gaining an understanding of the phonetic principles underlying printed language. Fisher[4] (1905) advocated the "look and read" method, that is, learning printed words by sight merely and not through phonetic analysis, because it was "obviously desirable that the shortest route to reading should be taken." The case which he reported, however, learned by the method of phonetic analysis. The phonetic method has been advocated by all other writers who made suggestions for the education of such cases.

[1] Jackson, "Developmental Alexia," *A.J. of Med. Sc.*, 1906.

[2] Thomas, *op. cit.*

[3] Warburg, *op. cit.*

[4] Fisher, "A Case of Congenital Wordblindness," *Ophthalmic Review*, 1905.

McCready[1] reported the methods used in teaching a twenty-year-old boy who had not learned to read. The methods are of value even though one may doubt the diagnosis of congenital word-blindness. At the time of becoming a patient of McCready the boy was a stutterer; he had been wearing glasses for eleven years; he was suffering from a high degree of hypermetropia with a moderate amount of primary atrophy of both eyes. The boy confessed that he stuttered often when reading to cover the fact of inability to recognize the words. These facts are sufficient to give greater credence to another type of explanation for the poor reading ability than the diagnosis of congenital word-blindness. In the treatment of this case McCready says:

> The object aimed at . . . . after the correction of the speech defect was the development of the visual word center in the right hemisphere, and the establishment of functional relationship between it and the auditory word center as well as Broca's center in the left hemisphere. To this end the patient was first taught to use his left hand, as advised by Bastian in the acquired form of word-blindness and later by Claiborne in the congenital form. He was then made to receive oft-repeated impressions of words through every possible avenue, through his auditory center by hearing himself pronounce them, which last brought the glosso-kinaesthetic center into play by tracing over words at the same time pronouncing them himself, thus bringing all the centers involved in speech in accord at the same time. In addition he was given visual impressions of words in as many forms as possible, written, printed, on the blackboard, cut out of cardboard, on the spelling board, etc. . . . . He can now read a page of printed matter composed of the more common words almost as quickly as a person with normal visual memory, and is able to read for pleasure. . . . . His progress in other elementary studies is equally satisfactory.

Thomas[2] recorded some observations of congenital word-blind children which are of interest:

> One child by rapidly spelling the letters with the lips will arrive at the meaning of the word, another will trace the letters in the air on the book with the fingers, and thus arrive at the meaning. A child . . . . was unable to assign the meaning to a word until he had written it himself; if he looked at the word "cat" it conveyed no meaning; if he had it spelled aloud to him he could not arrive at the word (he was a poor "audial" as well as a poor "visual"); if he spelt aloud the word himself he could not tell what it was; but

[1] McCready, "Congenital Wordblindness as a Cause of Backwardness in School Children," *Penn. Med. Jour.*, 1910.

[2] Thomas, *op. cit.*

immediately after he wrote it down his puzzled expression gave place to one of intelligence and he shouted the word "cat."

The foregoing paragraphs constitute a general account of the literature on congenital word-blindness from the standpoint of the medical profession which has been almost alone in recognizing and isolating this type of mental defect. Schröck[1] (1915) discusses in detail all previous reports with a bibliography of thirty-two names. The reader is referred to that article for further detail. A shorter account by Clemesha[2] (1915) may serve the same purpose.

REVIEW OF PSYCHOLOGICAL PAPERS ON CASES

On the psychological side but few references are found. Voss[3] (1914) gave a set of stimulus words to two groups of children, eight to ten and eleven to thirteen years of age, respectively. One thirteen-year-old child was a case of congenital word-blindness. He found that this boy's reactions were on a lower plane of intelligence than those of the average or well-endowed children. He suggests that the association method may be of value in revealing the mental content of aphasia and speech defect cases.

Witmer[4] (1907) reported a case which he diagnosed as *amnesia visualis verbalis*. The case was not one of true word-blindness, however. The child was found later to have a visual defect and improved in reading in a reasonable time after correction of this defect. In 1914 Witmer called attention to a class of children with mental defects as distinguished from mentally defective children. In this article a child was reported as a case of congenital word-blindness, but who at times suffered a degree of word-deafness and motor verbal aphasia. The description of the child shows him as too complex a case to be diagnosed as simple congenital word-

[1] Schröck, "Ueber Kongenitale Wortblindheit," *Klin. Monatsbl. f. Auhenh.*, 1915.

[2] Clemesha, "Congenital Wordblindness," *Jour. Ophth. and Otolaryngol.*, 1915.

[3] Voss, "Ueber die Assoziationsprüfung bei Kindern nebst einem Beitrag zum Frage der Wortblindheit," *Zeitschr. f. d. ges. Neurol. u. Psychiat.*, 1914.

[4] Witmer, "A Case of Chronic Bad Spelling, Amnesia Visualis Verbalis," *Psych. Cl.*, 1907; "Children with Mental Defects Distinguished from Mentally Defective Children," *Psych. Cl.*, 1913.

blindness. What Witmer says upon the subject of special defects is worth quoting:

> While it is doubtless true that brain injuries may produce aphasia and amusia in children and if such injuries occur during uterine life the condition may properly be described as congenital, nevertheless I believe we must consider that congenital aphasia and amusia do not rest upon a pathological condition of the brain, but are indicative of a tendency to biological variation appearing in the affected children restrictedly as variation of the functional activities of language and music. Congenital aphasia and amusia are to be explained in biological terms, in somewhat the same manner as we should undertake to explain left-handedness in about 2 per cent of the race.

Town[1] (1912) in an article on "Congenital Aphasia," mentions the fact of inability to learn to read and includes it among the aphasias.

In the experience of the writer as examiner of problem children of the public school, those who find difficulty in learning to read quite out of proportion to their ability to learn other subjects and not at all or not adequately accounted for by general poor mental ability are frequently met with.

METHODS OF TREATING CHICAGO CASES

Coming back to the three Chicago cases described above, it will be remembered that these children were turned over to a special teacher. This teacher, Mrs. Lelah C. Russell, employed special methods with the pupils. The devices which she used were action words and elaborate phonetic stories. She printed and wrote such words as "run," "come," "walk," "jump" on cards and used them in games with the pupils. The play impulse of the pupils was thus utilized to turn their attention to printed words. The phonic training was by means of stories which Mrs. Russell describes in the following statement:

> Along with this work [use of action words] and beginning with it the phonic side of reading should be taken up. The easiest sounds should be taught first. The easiest are those which can be prolonged indefinitely, such as *r*, *f*, *l*, *m*, *s*. In the effort to make the work interesting and enjoyable the phonics are presented in a story, associating each sound with parts of the story. The story is told as a serial, stopping at an interesting point at the end of each period. The capital and small letters of the alphabet are printed on cards,

[1] Town, "Congenital Aphasia," *Psych. Cl.*, 1912.

one to a card, including the combinations *sh, wh, th, ch.* On the reverse side of the card the capital and small letters are written in script. The story goes as follows:

When I was a little girl just about as big as you little people, we lived on a farm. My brother, who was two years older than I, had a dog whose name was Spot. I had a dear little kitten, Tabby. One day Bert, my brother, and I were playing in the orchard. You know what an orchard is, don't you? Yes, that's right, it is a big yard full of fruit trees. Now can you guess why we liked to play in the orchard? Yes, that's right, you know little boys and girls like cherries and apples.

All at once we heard old Spot saying "r, r, r." Did you ever hear a dog growl like that? (show letter) What did he say? (write letter on board) (Children keenly interested repeat "r, r, r," associating the sound with the letter.) We ran quickly to the place from which the sound came and what do you think? There was Spot standing on his hind legs with his forepaws stretched high up on the tree still saying (present card r).

Bert laughed to see old Spot, but I cried when I looked up in the tree and saw my Tabby with her back arched like a Hallowe'en kitty and her tail twice as big as it ought to be saying "f, f, f" (show card and write letter on board). I made Spot get down and scolded him for frightening my kitty. Bert climbed up into the tree and handed me Tabby. While he was getting her he spied some ripe cherries. He ate so many and ate them so fast that he swallowed a seed and while he was trying to get it out of his throat he said "c, c, c" (present card, etc.). So he came down and didn't eat any more cherries.

Just then we heard mother ring the bell, which meant that dinner was ready. It said "l, l, l." We all scampered to the house. When we got there Spot was very tired. I heard him say "h, h, h," so I knew he wanted a drink.

Mother told Bert to go to the barn and feed old bossy cow who had been saying "m, m, m" for a long time.

The story goes on in this fashion day after day, each lesson reviewing sounds already learned and adding new ones. Simultaneous with the teaching of phonics should be taken up the training of the ear in the analysis of the sounds of form words. Give a few ear-training sentences: "F-old your hands," "F-old your arms," "R-un to me." Have the sentence acted by individuals and the class. Then spend some time in pronouncing out the sounds of phonetic words alone, not in sentences, and have the pupils tell the word which they make.

When the ear has been trained to hear words when sounded, proceed with graphic word-building. This training is carried on by writing phonic words on the board and having the children blend and pronounce. The Aldine Chart is very helpful for this drill or one may print lists of phonetic words on strips of cardboard, such as all words ending in the phonograms *at, an, all, et,* etc. A list of such words is as follows: "at," "bat," "cat," "fat," "rat," "mat."

The child learns the phonogram or "family" *at* with which other sounds may be combined.

The various lines of training are carried on at the same time. During the day, at one period action sight words are being learned, at another ear training is given, etc.

DESCRIPTION OF RESULTS

The results of this instruction were tested with the following indications of improvement.

The children showed during the first six months of their residence in the special room a good beginning in the mastery of phonics, as may be seen from the detailed reports of their reactions to the reading tests. They had gained in that time about the same in reading ability as is gained by first-grade children in the first half-year of their school life. Since they had gained almost nothing in their previous school life and had been making no observable progress up to the time of their residence in the special room, the new acquisition must be credited to the specialized teaching received there. After this period of residence the children showed a different quality in their reactions to the reading tests. It was as though they had learned that this process was one with which they could cope, and they therefore worked at it with apparent confidence in their ability to master what was given them.

DETAILS OF TESTS AFTER TRAINING

Case 1.—When seen again in June, 1916, he read Selection A in 9 minutes and 49 seconds, failing to recognize such words as "could," "grapes," "high," "knew," "better." He spelled out phonetically correct "grapevine," shortening the vowels, "air," "those," "get," "last," "not." At this time he did cross-line A and cross-line B correctly at the first attempt. He had made normal progress in number work.

When seen again in December, 1916, he read Selection A in 3 minutes and 12 seconds without any mispronunciations but studied many of the words carefully before pronouncing them. He read the first sentence of Selection B in 3 minutes and 30 seconds, working out correctly "spring," "year," "about," "ten," "Amos," "Bliss," "manager," "proprietors," "northern," "spectator," "garden,"

"planting," "potatoes." He wrote correctly from dictation, "The cat ran away." When asked to write "The printer made some cards," he wrote "The printr made som cards." Before writing the unfamiliar words he audibly dissected them phonetically. He had made normal progress in the number work and other subjects of the school curriculum.

He was seen again in February, 1917. Unfortunately his record with Selections A and B has been lost. His record with the reading test of the ten-year group of the Terman Scale is as follows: Time, 3 minutes and 15 seconds. Spelled out phonetically correct "September," "fire," "near," "center," "families," "saving," "burned," "hands"; missed only one word in the selection. Gave an adequate account involving eight items. He showed his quickness of comprehension in his reaction to tests in many ways. For instance, when given the Healy Apperception Test, before an explanation could be made of the meaning of the test he had glanced over it and remarked, "Oh, this is easy. I see how it goes," and proceeded to fill the requirements of the test without any error.

Case 2.—When seen again in June, 1916, he read Selection A in 9 minutes and 45 seconds, spelling out most of the words phonetically correct but not conventionally correct. For instance, the words "find," "fine," "like" were pronounced with short *i*. He was unable to work out such words as "hungry," "said," "could," "grapevine," "high." He was able to recognize these words when they occurred a second time in the selection, the examiner having pronounced them for him at his first failure. He was making normal progress in other subjects of the school work. He left the city soon after this time and was not seen again.

Case 3.—She was seen again in June, 1916, after nearly six months of the kind of instruction described. She read Selection A in 1 minute and 15 seconds with no errors. She had not seen it since her last examination and since leaving the first grade had seen it only upon such occasions. She read Selection B in 9 minutes and 26 seconds, spelling out correctly such words as "heard," "turning," "became," "dimly," "villages," "wandering," "quickly";

failed with such words as "proprietors," "spectator," "conscious," "neighbors," "continued." She was continuing her progress in arithmetic. At this time she did the code test with four errors, which shows fair ability at concentration of attention.

She was seen again in December, 1916. She read Selection B in 9 minutes with a phonetic ability not especially better than at the time of her last examination. At this time the child left the school without leaving the address of her new home and has not since been located.

DESCRIPTION OF CASES OF EXTREME DEFICIENCY

Before attempting to relate the facts which come out in the study of these cases to the general analysis of ordinary cases which was made in earlier chapters it will be useful to study briefly the characteristics of true defectives. Many of the pupils who fail to learn to read in the early grades are of low mental development. We may borrow from an earlier discussion of cases of this type published in a monograph of the *Psychological Review*.

> The accomplishment of the child in this subject [reading] may be arranged with reference to *quantity and quality*. A defective child may be deficient in one or both of these two characteristics of the reading accomplishment. He may be incapable of learning to recognize the words of the printed page; he may show himself capable of learning words only very slowly or of forgetting them quickly and easily; he may show himself capable of learning words with some facility in memorizing them, and so of becoming a good reader, but incapable of gaining ideas from the words which he reads. It is this latter characteristic which one is to understand as included in its various aspects under the term "quality."
>
> The child may show an ability to recognize words from the printed page to a greater or less extent, but this recognition with the defective child consists largely, merely of a mechanical type of visual memory which serves as stimulus for its associated vocal prototype. The child who learns words in this way only is always dependent upon his teacher, since he can acquire for himself no new or unfamiliar word from the printed page. He can become somewhat independent of his teacher only if he learns phonetic values. Defective children are sometimes capable of acquiring very large visual vocabularies but show themselves quite deficient in perceiving phonetic relationships. . . . . The various steps from the early period of the reading accomplishment to its complex fulfilment are indicated as follows:

A. QUANTITY

1. *Knows no words.*—This is the condition of the average child when he enters school at six or seven years of age, and is one persisted in by the low type of defective child for several years or longer. This low type of defective child shows himself incapable of perceiving the fine differences which serve to distinguish one word from another on the printed page, though he is able to use spoken language. Some knowledge of the degree of his defectiveness may be gained when one knows the length of time in which he has persisted in this disability.

2. *Can recognize a few unrelated words.*—This is the accomplishment of the average normal child after a few days spent in the school. It is a *condition* persisted in by many defective children sometimes for years. In such case, the defective child has learned a word here and a word there which have stuck in his memory, and he recognizes them wherever he sees them. He shows himself, however, incapable of gaining sufficient words to make his reading a consecutive process with regard to meaning. The words which he does learn bear, perhaps, no relation to the amount or type of teaching that has been given. The learning of them is largely a matter of chance, and just why certain words have been learned and many others imparted at the same time in his instruction have been forgotten cannot be determined.

3. *Can read entire sentence in the first or some other reader.*—This step in its simplest form is attained by the child after a few weeks in school. The reader which he has in school—if because of being a defective he is placed in an ungraded room—compared with the number of years that the child has been in school is some measure of his defectiveness in learning to read.

4. *Can read at sight any material such as newspapers, etc.*—This is the highest grade which may be attained in the ability to read, with reference to quantity. It is attained by the normal child with the fifth grade.

The phonetics which underlie the reading process is the great stumbling-block of the defective child. Seldom is one found who has this accomplishment. He may be able to learn a very few of the simplest combinations, such as consist of one or two consonants and a vowel. The normal child progresses in his knowledge of phonetic values, to such an extent that he becomes independent of the teacher in so far as the illogical complexities of our English spelling permit. At the fourth grade the normal child is able to work out new and unfamiliar words with approximate phonetic correctness.

B. QUALITY

1. *Mechanical.*—The defective child may be able to accomplish with reference to quantity in reading anything between the limits set above from the lowest to the highest stage of accomplishment. However great his accomplishment in the quantity of his reading, he is unable to read a new passage other than mechanically; that is, all he can do is to use a familiar popular phrase,

parrot-like. This type of reading may be described as a straight-line association between the visual and the vocal centers. The child makes no, or few, other associations with the ideas gained from the printed page before him. The words or ideas which he reads do not relate themselves in his mind with anything else he has read or with other experiences he has had, such that a complex of related ideas are formed in his mind which he can reproduce orally or otherwise. He can reproduce few, if any, of the ideas which the page contains. Upon being asked what he has read about, he remains dumb or answers merely with a word or phrase contained in what he has read. This type of reading may be suspected from the monotonous tone with which it is delivered. An extreme example of this was that of a girl of eleven, found in the second grade. She had attained the fourth step in quantity, and was very proficient in her rendering of phonetic values. She read a long paragraph, of which the following is the beginning sentence: "It was in the spring of the year 1826, about ten o'clock, when Mr. Amos Bliss, manager and one of the proprietors of the *Northern Spectator*, was in the garden behind his house planting potatoes," etc. This selection was taken from a fifth reader which she had never seen. She pondered over the unfamiliar words "spectator," "manager," "proprietors," and pronounced them correctly, with very little loss of time. The other words in the selection were read with little or no hesitation. Upon being asked what she had read about, she made no reply; and when the question was repeated she finally said, "It was about a horse." The selection contained no reference to a horse, but the opposite page contained a picture of one. The normal child, when reading material which is not familiar to him, must give much attention to spelling and deciphering unfamiliar words; he will often because of this distraction be unable to give the sense of the selection read. A judgment of the quality of the child's reading should, therefore, in every case be deduced only from material which he reads with reasonable facility and which contains few if any unfamiliar words.

2. *Appreciative.*—This type of reading is the opposite of the mechanical type just discussed. With this type there is usually expression of tone in reading which shows the child's understanding or appreciation of the selection read. Upon being questioned, he can tell in a sentence or more the essential elements of the selection. It is usually a sure sign that the reading has been appreciative if pleasure is shown. However, expression is not an infallible test. Defective children may be trained to read selections with expression, and if the circumstances of the training have been pleasant the child may incorporate these pleasant associations into the reading process itself, so that he seems to be enjoying the ideas derived from the selection. In such a case, however, he fails to read with expression or to reproduce the sense of the meaning when the same material is arranged in unfamiliar form.

3. *Apperceptive.*—This is a grade of performance above the *appreciative*, in that there is a relating of what is read to a larger complex of knowledge or experience in addition to the reproducing of content. In this type of reading

the child can reproduce orally without further prompting the essential details and can give an interpretation of a selection. Fables lend themselves readily to such an interpretive test. Defective children often can answer correctly any questions asked about a selection read, but are unable to organize it for themselves and are unable to give an interpretation of its meaning when the material is of a literary type other than that of didactic narrative.

4. *Initiative.*—Reads voluntarily. Many children who attain the highest stage as relates to quantity in reading may at the same time really be able to gain so little from such abstractly represented ideas that they never voluntarily read for their own pleasure. Many children who have not yet gained the highest stage as relates to quantity still read voluntarily because of a desire to gain knowledge or to meet certain social demands. It is seldom that a defective child reads from any other motive than to please his teacher.[1]

The cases discussed in this chapter supplement the cases which were analyzed in the preceding chapters. There is here, perhaps, more than in the earlier chapters, material on which to base conclusions as to the way in which pupils should be treated in the early stages of instruction in reading.

[1] Clara Schmitt, *Standardization of Tests for Defective Children*, Psychological Review of Monographs, Vol. XIX, No. 3 (July, 1915), 137–42.

CHAPTER VII

PROGRESS THROUGH THE GRADES

The last three chapters of this report will be devoted to the practical applications of the facts which have been presented up to this point. The first of these chapters on applications will deal with the relation of progress in reading to the general mental development of pupils as they pass through the grades of the elementary school. The second will present suggestions as to the methods of diagnosing individual cases. The third will discuss the contrast between the mechanical side of the reading process and the true purpose of all reading lessons, namely, the acquisition of power to get meaning from the printed page.

EDUCATION BEFORE THE SCHOOL PERIOD

The relation of reading to progress through the grades can be understood only by going back of the period of formal school education. Up to six years of age the child's education consists largely in learning oral language. Indeed, if one asks why the beginning of schooling is set the world over at about six years of age one finds the answer to the question in the fact that until this age the child is not able to move independently in a large social group. Before six years of age the child cannot express himself well enough to go outside the family, nor can he understand what those about him are saying. He may, indeed, enter the kindergarten or some other school which aims to prepare him for participation in the activities of a social group, but the young child is not in a position to take on an education in any proper sense until he has command of oral language.

There are schools which are much embarrassed in their work because the pupils do not speak English, and there are individual pupils in the first grade who have only a limited command of language because they are backward in general mental development. These cases are conspicuous as departures from the general rule

that pupils of six years of age commonly know enough language to conduct themselves in the social group with independence.

It is at this point that pupils come to school. The school has the duty of extending their knowledge of oral language and of introducing them to the large body of experiences which will make language the vehicle of ideas. It is also the duty of the school to introduce pupils to a new type of language, namely, written or printed language.

SHALL READING BEGIN EARLY?

It has sometimes been argued that children ought not to be taught to read in the first grade. This is the time, it is said, when pupils are interested in objects and in constructive activities. The answer to these arguments is to be found in the natural demand made by the pupils themselves that they be introduced into everything that older people do. It is true that the first-grade child is very much interested in the world as it appeals to his senses; but of all the points of interest in the world people are the most absorbing. A first-grade child uses his senses to see and hear and come in contact with people. He has devoted all of his earlier years to acquiring language so that he may be a part of the world of people. and now he wants to write his name and he wants to know how to extract for himself the interesting stories which he knows are in books. The desire for an extension of his experience to the new forms of language is a part of the child's absorbing interest in people.

The argument in favor of teaching reading in the lower grades can be supported further on certain psychological grounds which can be made clear through consideration of the relation between reading and oral language. Both oral and written words derive their meaning from experiences outside of themselves. During the first years of his life the normal child has acquired the power of associating an oral word with its meaning. The connection between word and meaning has become so intimate that one stands in experience for the other. This connection between word and meaning becomes a dominant fact in the individual's life. Ultimately every idea the child has tends to take on the form of a word,

and most of his thinking is done with words. In the early years while many new words and meanings are being acquired the child's attention can readily be turned to a new form of verbal expression, while at a later stage the child will be less eager to acquire the new form of language involved in reading. Pupils who do not learn to read early often have difficulty in learning to read in the upper grades.

The reason for this difficulty will be clear from the consideration of an analogy. The person who acquires a foreign language late in life always finds himself handicapped. He is, in the first place, defective in pronunciation. The reason for this is that the sounds of his native tongue monopolize his habits of articulation. He is not able to take on the new habits of articulation demanded for perfect pronunciation of the foreign tongue. As it is with the associations of utterance so it is also with grammatical structures and shades of meaning. The native tongue dominates. On the other hand, a child can acquire two languages in early youth and make a complete success of both. The child is plastic in his habits.

The analogy is appropriate to our discussion of reading. In a very important sense written language is a new system of experience. It has intimate relations with speech, but the child who is to read fluently must break up the mere oral associations and take on an additional system of experience. His language associations must be fluid, easily drawn off into new channels. This is the reason why pupils who get bad habits or no habits of reading in the early years of school life are exceptionally difficult to train in the fourth, fifth, and sixth grades.

Such considerations as these show how crucial is the matter of early training in reading. The six-year-old child has gone far enough in his natural development to be independent in speech. He understands most of the simple sentences addressed to him. He has this form of association well under way. Now is the moment to attach to language consciousness a new system of elements—written and printed words. The addition of this new set of associations belongs to the period in the natural development of the child when speech is not absolutely fixed and when it is, on the other hand, a firm enough foundation on which to work.

INDIVIDUAL DIFFERENCES APPEAR EARLY

Throughout the discussion we have accepted the phrase "about the sixth year" as defining the crucial period. There can be little doubt that here, as in all other matters of education, individual differences should receive more attention than they have in the past. Some kindergarten pupils ought to be taught to read and some first-grade pupils have not reached the stage of maturity where instruction in reading is appropriate.

ORAL READING THE NATURAL FORM OF PRIMARY READING

We have now reached the point in our discussion where we can readily see the importance of a clear understanding of the relation of oral language to reading. Oral expression is familiar to the pupil when he begins to read. It is so far ahead of his power of recognizing printed words that the printed words cannot under any circumstances escape association in experience with uttered and heard words.

Furthermore, spoken language, by its historical and structural relations to written language, naturally dominates reading. Printed words are not related directly to things but to the sounds which make up the names of things. In other words, letters are symbols of sounds, not pictures of objects. We may put pictures into reading books to illustrate the story, but the child cannot make a direct jump from the picture to the printed word; he must go by way of sounds. Going by way of sounds is more natural because when he comes to the reading class the child brings a fully developed mastery of many sound words and their meanings.

It may be concluded, therefore, as the first dominant principle in the teaching of reading in the primary grades that all printed and written words are naturally associated with sounds, that is, with oral language.

READING MATTER MUST BE ANALYZED

The foregoing paragraphs do not settle one important question. This question can be brought out by drawing attention to the fact that a pupil who is confronted by a written or printed page must take this page into his experience in some kind of small units.

Not even the adult skilled in reading can take in at a glance a whole page or even a whole line. It is a mental necessity, therefore, that the child break up a printed page into small units. Our question is, What are the most advantageous units in which a pupil may see the printed page?

There are several possible answers to this question. The A-B-C method answered it by saying that the child should learn first the letters. We may speak of letters as the smallest visual units. Letters are in one sense also the smallest sound units, but the relation between sounds and single letters has become so complicated in English that the pupil is more likely to be confused than helped by learning letters as the smallest sound units.

Various phonic methods have therefore superseded the letter method. A phonic system represents an effort to find a fairly simple visual element which fits a sound element. The last two letters in "sit," "fit," and "knit" represent an interesting and constant sound as well as a fairly simple visual unit.

The phonic element has one great disadvantage. While it is a simple visual unit it has very little interest for the child trained in oral expression. The units of a child's speech in conversation are words and meaningful phrases. Indeed, there is ample evidence from the study of languages and their evolution that the unit of oral expression was originally the whole sentence. One has only to think of a Latin verb to remember that this verb has rolled into a single unit of utterance a pronoun, an auxiliary verb, and the main root. Since the unit of speech is the word or meaningful sentence it is very difficult for the young pupil who is beginning to read to interest himself in mere phonic elements. He naturally interests himself in words, not in letters or phonic units.

Our discussion shows us that there are several kinds of units involved in the teaching of reading. There is the meaningful sound unit made up of a word or phrase which the child can speak and understand; there is the printed word; and finally the phonetic element made up of a simple combination of letters and corresponding to a sound element which is in itself without interesting meaning. The problem before the teacher of reading is to take the oral

language with which the pupil is familiar and by the most economical method to add to his mental equipment printed words and phrases.

Suppose that we accept the oral word as the determining factor and associate with it as best we can the complex of letters which go to make up the printed word. This is what the word method does, and it is the quickest and most successful method of teaching primary reading. If this method is followed it encounters no serious difficulties until the vocabulary involved is extended to the point where it begins to include words not in the child's ordinary speech and words of some length. Then the word method begins to be in difficulty. The child sees a mass of letters which he cannot readily recognize, and he exhibits his inability to cope with the situation in one of two ways. Either he turns away from the word or he tries to break up the word into smaller visual units with which he can cope.

The child who turns away from the word is by no means uncommon in the school. The accounts given at length in an earlier chapter of pupils who could not and did not learn to read until special methods were employed are striking examples of pupils who had to be led to analyze words before they would pay any attention whatever to them. If these cases are carefully studied it will be found that the pupils made no effort at first to associate written words with their other experiences. The special teacher mastered these cases by two devices. First, the word was in some cases connected with an act. This gave the pupil a vivid personal interest in the word. The pupil connected the sound "run" with the printed word after he had acted out the word and had thus become interested in it. Secondly, the teacher interested the pupil, in a very artificial but effective way, in the letter analysis of words. In short the teacher used the analysis of words into their short elements as a device to get attention concentrated on the printed material.

Analysis often has a motive other than that just discussed of concentrating attention on words. It is necessary for progress in reading on the part of the child who is confused by a mass of letters. In the photographic records numerous examples were

given of utter confusion. Confusion appears when the pupil cannot recognize a word and exhibits in his short backward and forward eye-movements an irregular and ineffective analysis.

SPELLING ABSOLUTELY DEPENDENT ON ANALYSIS

At this point it is essential that we consider a matter which does not come in its details within the compass of this report, that is, the matter of spelling. Sooner or later the pupil has to acquire this complicated art. Then he has to know words in detail.

ANALYSIS A LEGITIMATE PHASE OF READING

Analysis of words cannot be omitted from any complete training of pupils. The experience of schools in this matter is unequivocal. A child can read without analysis so long as his vocabulary is small and the words are short, but sooner or later he must make analyses, and then he will be greatly helped if he has been trained in systematic methods. As to the time when this analysis should be introduced, it seems to be suggested by the dominance of oral language at the beginning of school life that the word unit be accepted at first and analysis be introduced later when it is needed to keep the word units clear.

THE DEPENDENCE OF READING ON ORAL LANGUAGE IS NOT FINAL

What has been said by way of emphasizing the relation of written words to oral language is capable of one misinterpretation which must be explicitly dealt with. The end of reading is not the pronunciation of words. It appears too often in reading classes that teachers are satisfied with the reading exercise when it issues in pronunciation of the words. Indeed, pupils are misled by the demands of the school into the same false view about reading. Especially is it true in the upper grades, where the reading matter begins to have a complex meaning, that pupils often get no farther than the sounding of the words. The problem here suggested is of major importance and will be taken up in the final chapter of this report. For the time being it is enough to point out that an oral word or a sound word gets its real meaning because of the mental

processes which it sets up. If the word is a verb such as "run," the experience aroused can be described as an impulse to act. If the word is the name of a virtue, like "honesty," there is a feeling of approbation and possibly a vague memory of some example of honesty. In other cases a memory image of some person or thing is recalled. All these examples serve to emphasize the fact that pronouncing words cannot be treated as a legitimate end in itself. Oral reading is a means to a higher end. Oral reading is legitimate as an introductory device in the first grade. Indeed, oral reading is a necessity in the lower grades because the pupil enters school with oral language developed. But oral reading is a menace to intelligence when it emphasizes such matters as enunciation and forms of expression to such an extent as to eclipse the recognition of meanings.

All these discussions go to show that one of the major problems in the scientific study of reading is to discover the relation between reading and speech. Thus far we have seen that at the beginning of school training oral methods are legitimate. It remains for us to determine how far up through the grades it is legitimate to emphasize oral methods.

EVIDENCES BEARING ON PLACE OF ORAL READING IN UPPER GRADES

If we go beyond the primary grades or the first stages of instruction in reading we have no difficulty in finding grounds for the conclusion that the methods appropriate in the primary grades are wholly inappropriate in the upper grades. Evidence of a very simple and convincing type can be collected by measuring the rates of certain component elements of the reading process.

First, we may find out how rapidly pupils can articulate in the various grades. Such a measurement is of necessity somewhat rough because variations in the clearness of articulation cannot be avoided and because there are great differences in the general rates of muscular reactions in different individuals. In spite of these differences, however, such a measurement will show a very striking uniformity between the rates of articulation in the different grades.

A test was made by asking pupils in all the grades to count from one to ten as fast as possible and as many times as possible in ten seconds. Table XXXI reports the average number of full counts up to ten for each grade.

TABLE XXXI

RATE OF RAPID ARTICULATION (COUNTING TENS) IN VARIOUS GRADES*

Grade	Number of Pupils	Average Number of Tens in Ten Seconds	Mean Variation
Kindergarten	9	6.8	0.7
1	4	6.3	0.4
2	7	6.6	0.5
3	5	6.6	0.5
4	10	6.9	0.4
5	13	7.0	0.2
6	12	7.3	0.7
7	11	7.4	0.6

* The University Elementary School has only seven grades; hence the seventh grade is the highest in these tables.

An interesting variation of this experiment was introduced by asking the pupils to count for thirty seconds. The younger pupils got tangled up and out of breath and therefore made lower scores, as indicated in Table XXXII. The reduction in scores is greater in the lower grades than in the higher.

TABLE XXXII

RATE OF SUSTAINED COUNTING IN THE DIFFERENT GRADES

Grade	Number of Pupils	Number of Tens Counted in Thirty Seconds	Mean Variation
Kindergarten	8	11.9	1.6
1	7	12.6	1.5
2	5	13.2	1.2
3	4	14.0	0.5
4	9	13.7	1.9
5	13	16.5	1.2
6	12	17.1	1.7
7	6	20.0	1.5

It should be noted that counting in this way with familiar words which are nearly all monosyllables is not an accurate method of

determining how many words are uttered in ordinary conversation or in ordinary successful reading. General observations together with the foregoing detailed figures justify the statement that the rate of articulation of pupils in the first grade is at least 75 per cent of the rate of articulation of seventh-grade pupils.

This means for the purposes of our inquiry that in the phase of oral reading which depends on mere power of articulation pupils in the first grade are at least three-quarters as well equipped as pupils in the upper grades.

We may adopt as a further basis for our discussion the rough generalization that seventh-grade pupils seldom read aloud more than 150 words per minute. This figure is derived by averaging the scores of oral reading of forty-four seventh grades of Cleveland, Ohio.

The full-drawn line in Fig. 1 represents the facts with regard to the rate of articulation in the grades. In the same figure the broken line represents the development in the power of recognizing words. This line must of necessity begin below the line for articulation. In many cases recognition is at absolute zero at the time the pupils come to the first grade. In the seventh grade the power of recognizing words is higher than the power of articulation. This statement is fully justified by the studies in earlier chapters of this report and by the whole body of evidence accumulated by earlier investigators. The evidence on this matter is most directly secured by studying the rate of silent reading where only recognition is involved. Oberholtzer gives the rate of silent reading in the seventh grades of Tulsa, Oklahoma, as from 210 to 275 words per minute and sets down as a standard for that grade 250 words per minute. How far above the line for articulation the line for recognition might go is difficult to decide because there is an artificial influence which distorts the situation. This artificial influence is the insistence of the schools on oral reading as the chief type of reading in the upper grades. This insistence tends to keep all children down in their silent reading to the rate set by the oral reading emphasized in the schools.

A study of Fig. 1 makes it clear that the relation between articulation and recognition is not the same in the upper grades as it is

in the lower grades. When the pupil reads aloud in the lower grades, he uses a form of expression which is far more fully developed than his power of recognition of words. In the upper grades exactly the reverse is true. When the teacher calls on an upper-grade

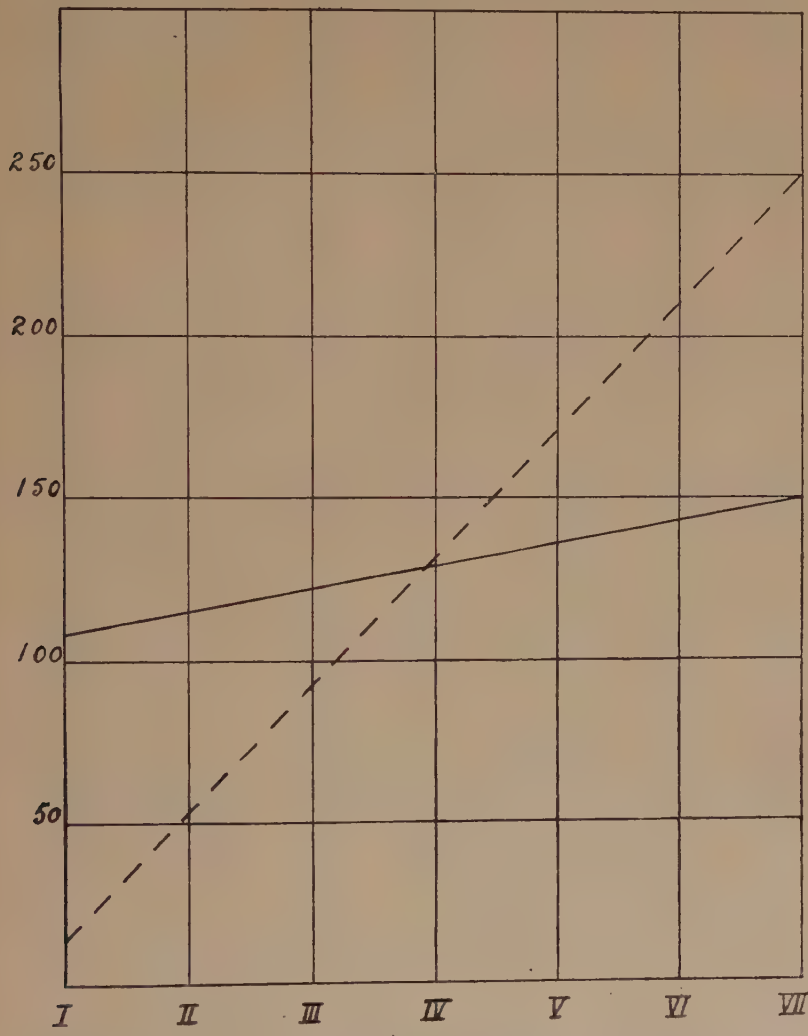


FIG. 1.—Improvement in rate of articulation and in rate of recognition of printed words in successive grades. The full-drawn line represents the rate of articulation. The broken line represents the rate of recognition of words.

pupil to read orally that pupil must go more slowly than he would if he were reading to himself.

The earlier sections of this report have shown the effect of oral reading on eye-movements. The eye-movements characteristic of good silent reading in the upper grades are free, long movements, showing that the unit of recognition is large. The characteristic eye-movements in oral reading, even of trained adults, show that the word is seldom transcended. Furthermore, the length of eye pauses is on the average greater in oral reading than in silent reading. (For an elaborate body of evidence on this matter see the monograph by W. A. Schmidt,[1] pages 39 to 42.)

SCHOOLS SHOULD TEACH SILENT READING

Why have the schools failed to recognize these facts? The answer is doubtless twofold. First, there is a natural tendency to continue methods which have proved successful in the lower grades even after the original justification for such methods has disappeared. Secondly, there are enough poor readers in every school to cover up the evil effects of slow methods in the upper grades. The conscientious teacher supplied with a reading book and a period in the program carries on with painful punctiliousness the well-known reading farce in the vain hope that the effects of unsuccessful teaching will be overcome by a liberal application of the same methods that produced the difficulty.

Teachers ought to recognize with clearness the fact that in the upper grades silent reading is the really useful type of reading. They ought to understand that pupils outgrow oral reading just as infants outgrow creeping when they learn to stand up and walk.

Even where the reader is deficient but has arrived in the upper grades there are methods other than those of phonic analysis and oral drill which will help him to master his difficulties. In the sixth chapter of this report methods of word analysis were described which avoid the mistake of merely repeating in the upper grades the primary methods which are no longer appropriate.

[1] *An Experimental Study in the Psychology of Reading*, Supplementary Educational Monographs of the *School Review* and the *Elementary School Journal*, Vol. I, No. 2 (1917).

ANSWERS TO CONSERVATIVE OBJECTIONS

The lessons which our study has brought out are not likely to be fully accepted by teachers addicted to oral reading in the upper grades until some answers are given to the conventional defenses offered by those who are obstinate in their devotion to the usual practices.

Such conservatives say that pupils should learn to enunciate clearly. This must be admitted. But why relegate good enunciation to the reading class? Good enunciation is desirable in the class in geography and in the class in arithmetic. Enunciation should be taught throughout the school.

Again, it is said that pupils must learn new words. This, too, is indubitably true. But why teach new words in the class devoted primarily to reading? Why not enlarge pupils' vocabularies in the classes where they are in contact with real experiences? Useful new words come up most naturally in geography and history and nature-study.

Finally, the conservatives appeal to the fact that when one reads poetry much of the charm is lost if one does not get the rhythm and the sounds of the words. Radicals are tempted to reply that the ordinary upper-grade rendering of poetry is likely to destroy the hope of anyone who finds in this exercise the chief defense of oral reading. But we may take the matter more seriously and admit that poetry ought to be read aloud. It is interesting to note that C. T. Gray finds that the rate of reading poetry is different from the rate of reading prose. There is probably some difference between the mental attitudes involved, and our main thesis with regard to school training will in no sense be weakened by the concession here made, even if it is made without reservations.

PERIOD OF CHANGE TO EMPHASIS ON SILENT READING

If a change in the method of teaching reading in the upper grades from that followed in the lower grades is recognized as in any degree desirable the question arises, When should the change be introduced? Put in terms of Fig. 1 the question takes the form, When does the broken line cross the full-drawn line?

The answer to this question is suggested by many facts which have come to light in recent investigations. In a paper presented to the College Teachers of Education in 1913 there is brought together under the title "Psychological Characteristics of the Intermediate Grades"[1] an array of facts which show that the fourth grade is the period in the school life of most pupils when they break away from the forms of study common to the primary grades and begin to show intellectual independence and initiative. This is a period when pupils begin to write more rapidly. The character of their work in arithmetic changes, and above all the character of their reading changes.

Since the appearance of that paper several studies have been made which concentrate attention on the fourth grade as a turning-point in reading. K. D. Waldo took measurements throughout a whole school system both in the autumn when the school year was opening and later in the spring after a school year of training. His results are given in Table XXXIII.

TABLE XXXIII

PERCENTAGE OF INCREASE IN THE RATE OF SILENT READING*

Grade	Fall Rate	Spring Rate	Percentage of Increase
3	76.4	149.1	95.2
4	92.7	163.3	76.1
5	113.0	129.2	14.3
6	128.0	130.1	1.2
7	122.7	142.8	16.4
8	147.2	158.9	8.0

* Karl Douglas Waldo "Tests in Reading in Sycamore Schools," *Elementary School Journal*, XV (January, 1915), 262.

The impressive fact in Table XXXIII is that the rate of improvement after the fourth grade is relatively small while the rate of improvement in the third and fourth grades is very marked.

Courtis,[2] proceeding by other methods, shows that the rate of careful reading is practically constant from the fifth grade on.

[1] *Yearbook of the Society of College Teachers of Education*, published as *School Review Monograph* No. III, February, 1913.

[2] *Elementary School Teacher*, XIV (April, 1914), 388.

Perhaps the most striking piece of evidence yet collected on this matter is the following from W. S. Gray's[1] monograph. Gray had the pupils in the grades from the second to the seventh read various passages orally. He tested the understanding of the passages by a series of questions. The passages gradually increased in difficulty. Each grade read as far as it could, the upper grades reading the later and more difficult passages while the lower grades stopped on the easier passages. Two sets of tests were given with an interval of four weeks between the two. In the first set the pupils read without preparation. In the second the pupils were given fifteen minutes to study the passages, the statement made to them being as follows: "You are going to take the oral-reading test again. Study the paragraphs carefully for fifteen minutes so that you can read them as well as possible and so that you can answer any questions which might be asked about each paragraph." The results are presented in Fig. 2. In this figure the upper full-drawn line, D, shows the level of comprehension in the first passage. All the grades stand well in this easy passage. The upper broken line, C, shows the improvement resulting from study. The full-drawn line below, H, shows the records made by successive grades in comprehending the most difficult passage read. This was a different passage for each of the grades. The steady drop to IVA shows that the pupils in the grades from IIA on are able to read orally, in increasing degree, passages which they cannot understand. Their scores consequently drop for the most difficult passage. Furthermore, when they study for fifteen minutes their scores are lower than in the cases where they were not allowed time for study. This means that the more they study the more they achieve on the mechanical side and the less they carry away in meanings.

The reversal of the direction of the curves at IIIA and IVA and the crossing of the two curves at IVB are very striking evidences that these grades are crucial periods in reading. The relation between oral reading and comprehension is radically different after Grade IVB.

[1] *Studies of Elementary-School Reading through Standardized Tests*, Supplementary Educational Monographs of the *School Review* and the *Elementary School Journal*, Vol. I, No. 1 (1917), 151–54.

Evidence of this type can be obtained from other sources, but enough has been brought together to make it certain that in the middle grades there is a change in relations between oral language

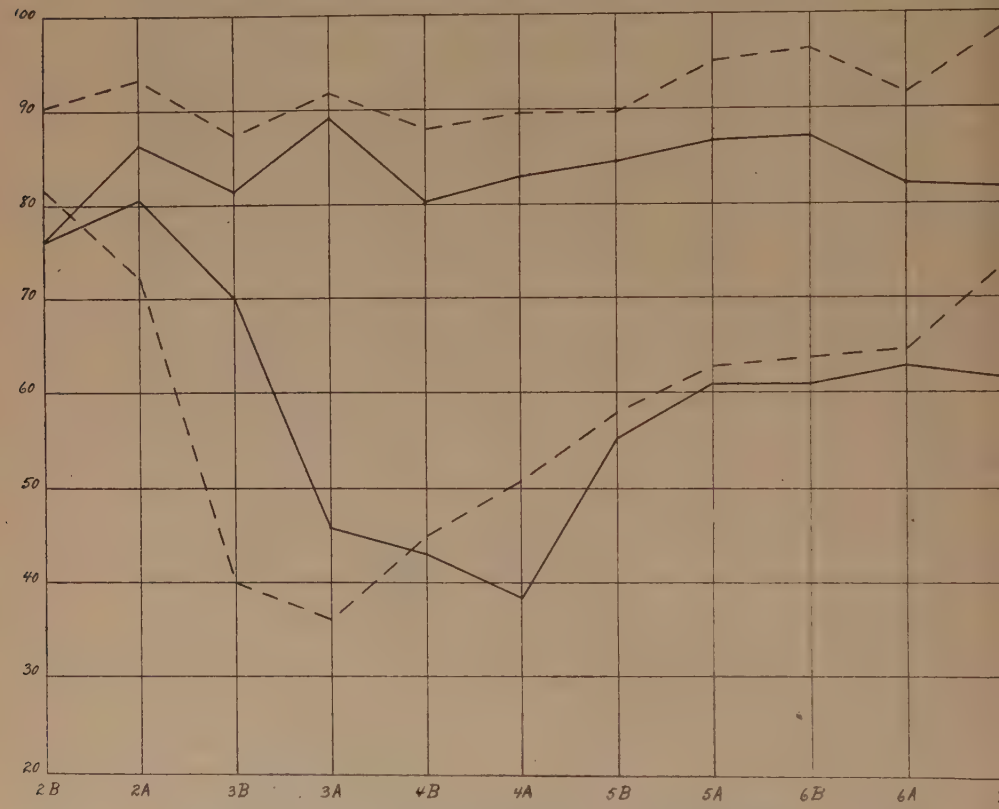


FIG. 2.—Reproduction of Diagram XXVI in W. S. Gray's monograph. Changes in comprehension of subject-matter resulting in the different grades from special training in the reading of easy paragraphs and difficult paragraphs. The upper full-drawn line, D, shows the records of the various grades on an easy passage. The upper broken line, C, shows improvement after 15 minutes of study. The lower full-drawn line, H, shows the records with the most difficult paragraph read. The lower broken line, E, shows the records after study.

and reading which ought to be recognized by a radical change in methods of instruction. Oral reading should give way to silent reading and phonic analysis should give place to word analysis.

Meanings should be emphasized and not the mechanical pronunciation of words.

TRAINING IN SILENT READING DEMANDED

Many schools have not recognized the demand for a new type of instruction in reading from the fourth grade on and as a result have seriously hindered the development of pupils. At this period the power of recognizing printed words has developed to the point where the pupil tends to throw off the limiting influences of oral language. In practical experience this is exhibited by the fact that the fourth-grade child reads with interest and avidity. Sometimes his eyes run along the line so rapidly that his vocal apparatus is hopelessly left behind. Fourth-grade teachers sometimes call attention to the fact that pupils who were very good oral readers in the third grade begin to stumble in the fourth grade. This stumbling is due to the failure of articulation to keep up with recognition.

It is at this point that a very radical change in attitude ought to be assumed by the school. Even before this stumbling begins the school ought to see the propriety of giving training in silent reading. In the fourth grade the pupil should be encouraged to make this the chief form of his reading. Later, if it is deemed wise, the school may come back to training in oral reading for the sake of appreciation and public exhibition. It is a mistake to jeopardize the child's independent, fluent silent reading in the fourth grade by insisting during this period on the usual oral exercises.

This is not the place to indulge in advice about the best way to cultivate silent reading. The methods of training pupils require careful co-operative testing. It may be useful to suggest, however, that the re-reading of familiar passages is one method of cultivating fluency. Also reading under the pressure of a time limit will train the pupil very quickly to utilize his powers of recognition more than he usually does. Methods of word analysis and of preparation for reading, such as were described in Chapter VI, are also useful.

DIFFICULT CASES IN THE UPPER GRADES

The last few pages have referred to the pupil who is making normal progress. Our photographs show and all school experience

shows that a very large percentage of pupils make less than the desired degree of progress. For such slow pupils methods of correction must be discovered. Enough has been said in the foregoing chapter to make it clear that something can be done even with poor readers, although it is evident that the more a pupil's habits become fixed the more difficult it is to secure improvement.

When one of these difficult cases comes up the teacher should not revert to the methods of the primary grades. The pupil is now mature in many ways, and his mind, like his body, has taken on fixed modes of action. It is therefore futile to try to improve a poor reader in the fifth grade by oral-reading lessons of the type appropriate for the second grade. The poor reader in the fifth grade must be studied with a view to finding his particular difficulty. When his special difficulty has been located special types of treatment can be devised. It will be the business of the next chapter to canvass in detail some aspects of this problem.

ENLARGING UNITS OF RECOGNITION

Returning to the main current of our discussion it remains to ask what we should do after passing the crucial fourth-grade stage of training. The answer to this question in terms of the photographs reported in earlier chapters is that a large part of the duty of the upper grades is to enlarge the units of recognition. It was shown there that a reader uses, when reading ordinary 11-point type, only a part of the possibilities of recognition which are supplied by his field of clear vision. If attention were given to this matter the school could undoubtedly produce a generation of readers with much broader units of recognition than adult readers of our generation commonly possess. It is not too fantastic to think of reading books printed with meaningful phrases separated from each other by spaces wider than those between words so as to induce in learners the habit of seeing phrases.

Improvement in recognition is probably not in any large degree a matter of training the eyes. Wide units of recognition demand for their development broad experiences which make possible the comprehension of meaningful phrases in a single mental act. On the negative side these wide units of recognition are possible only

when the limitations of articulation are thrown off. The good reader does not move his lips or attempt to say the words to himself. Indeed, there is probably no better way of recognizing a mature reader than to note the absence during silent reading of all tendencies toward vocalization. We may describe reading, therefore, as introduced in the lower grades through association with oral speech and as evolving in the upper grades just in the degree to which it cultivates units of recognition and interpretation that are broader than the single units of speech.

UPPER GRADES SHOULD CULTIVATE INTERPRETATION

The problem of the upper grades is, accordingly, a problem of fluent recognition. There is excellent evidence of this in material collected on a large scale by W. S. Gray. He has put together the results of a large number of tests in a diagram which shows at once the rate and the quality of silent reading in the various grades. This diagram in its simplest form is reproduced in Fig. 3. Progress in rate of silent reading is represented by movements toward the right in the figure. Changes in the vertical mean increase in power of comprehension. It will be seen that up to the fourth grade the improvement is chiefly in speed. From this point on improvement is largely in comprehension. This confirms the point made above, that the fourth grade is the turning-point, and at the same time defines for us the problem of the upper grades.

SUMMARY

1. Pupils bring with them to the first grade an independent command of oral language. Instruction in reading must recognize oral language as the natural basis on which the reading of primary pupils must be developed.

2. The recognition of printed words depends on an analysis in some measure of the sensory material offered to the eye.

3. This analysis is most naturally and most advantageously directed when the units of recognition are made to coincide at first with words which are the units of oral language.

4. Methods of systematic analysis, such as are supplied by the phonic systems, are needed to help the pupil in recognizing

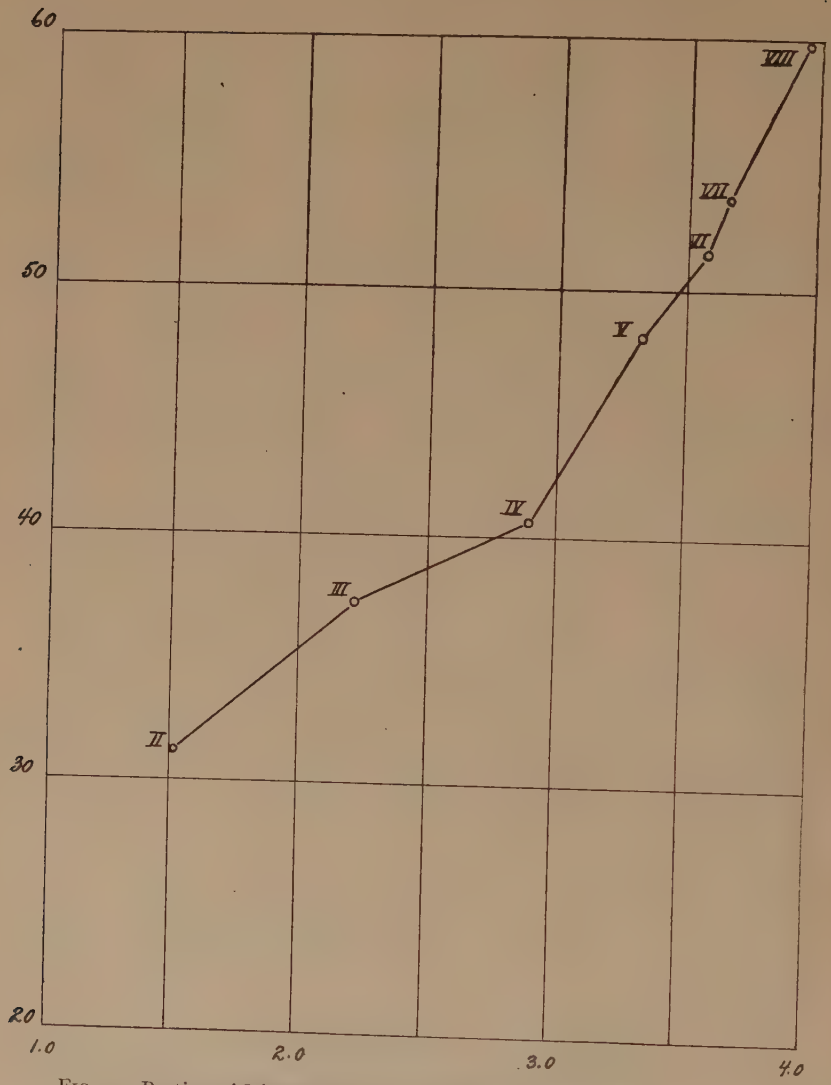


FIG. 3.—Portion of Diagram XX in W. S. Gray's monograph. Improvement in rate and quality of silent reading in 13 cities. The horizontal axis shows the number of words read per second. In the vertical are represented the changes in quality of reading.

new words, in spelling, and in extricating himself from difficulty encountered in visual perception.

5. In cases of backward readers, where the reading processes develop with difficulty, analytical methods may be necessary from the outset.

6. Analytical methods are opposed to the expansion of the unit of recognition; hence there must be special attention to the cultivation of wider spans of recognition. The analytical methods must not be allowed to dominate the later reading process.

7. The oral methods which are legitimate in the lower grades become inappropriate with the growth in fluency and range of recognition.

8. The fourth grade is a crucial point at which the methods of training should undergo a radical change to comport with the development of independence and breadth of recognition.

9. Beyond the fourth grade methods of instruction in silent reading should be developed. These methods should aim to develop wider spans of recognition and more fluent and complete interpretations.

10. Wherever intensive training is necessary in the upper grades because the methods of the lower grades have not been successful, the problem should be recognized as involving the demand for new methods suited to the pupil's maturity. It is not enough to revert to primary methods.

CHAPTER VIII

INDIVIDUAL DIFFERENCES

EVIDENCES OF INDIVIDUAL DIFFERENCES AND IMPORT OF THEIR DISCOVERY

In the course of this report twenty-one cases have been described in sufficient detail so that their individual characteristics are clearly marked. These cases are not all comparable with one another because they represent every stage of maturity from that of a competent adult reader to that of a backward child of the lower grades. However, enough opportunity has been given for comparison between pairs and small groups of cases and between the cases described in detail and the general level of school ability from which the cases were selected to leave in the mind of any careful reader a vivid recognition of the differences between individuals. These differences are so striking when they are brought out by analyses of the type here reported that one begins to wonder whether the grading system, which groups pupils in large units, can be scientifically justified. This question, it may be remarked, has been growing more and more acute in recent years as the results of extensive quantitative tests, especially in the surveys, have made it certain that large individual differences exist in every subject taught in the schools.

CONTRAST BETWEEN SCIENTIFIC AND PRACTICAL ATTITUDE TOWARD INDIVIDUAL DIFFERENCES

To be sure, scientific studies tend to exaggerate the differences, while in ordinary life differences are counterbalanced by various kinds of adjustments. Thus while scientific studies emphasize differences in rate of mental work, ordinary teaching and ordinary life make liberal time allowances. The slow child gets his lesson by using twice as much time as the rapid child.

Furthermore, in ordinary school work there is a large margin of material of instruction which is recognized both by the pupil and

by the teacher as not urgently necessary for an adequate understanding of the subject. The pupil who understands a fraction of the matter covered in the lesson will get on fairly well. In a carefully conducted test, on the other hand, each detail is weighed and the individual's score is exactly stated.

Finally, school grading concerns itself with many lines of achievement, while scientific tests are narrowly specialized. The child is promoted because of his rank in reading, arithmetic, geography, and three or four other subjects, while the scientific study of reading ignores for the moment the other lines of effort of the grade.

There can be no doubt that practical school officers have often overlooked these considerations and have not seen the possibilities of using the results of scientific studies in dealing with practical situations. It is the purpose of this chapter to describe a number of cases, which have not been exhaustively analyzed by exact methods, for the purpose of showing how the laboratory results reported in earlier chapters can be productively applied even in those practical situations where exact detailed analyses are difficult or impossible.

DIFFERENCES NATIVE OR ACQUIRED

There is one distinction which will be of help in this discussion; it is the distinction between native differences in capacity and acquired differences in methods of mental activity. Thus the pupil who has a phlegmatic physical and mental disposition will do all of his school work in a way to reflect the fundamental fact that he is phlegmatic. On the other hand, the pupil who does not know how to analyze a new word so as to select its phonic elements will be slow in reading, not because of a phlegmatic temperament, but because of his clumsy method of attack on the word. The gross results in the two cases may be much alike, but the causes are very different. Furthermore, the outcome of educational treatment in the two cases will be very different.

While it is easy to draw the distinction above described in a theoretical discussion of cases it is by no means easy to be sure of one's ground in practical procedure. The pupil who is phlegmatic

is very likely to be the one who does not understand instruction in the lower grades. As a result he gets behind the class and is neglected. This leads, in turn, to his cultivation of methods of procedure which are clumsy and often quite wrong. By the time the pupil reaches the intermediate grades it is difficult to say whether his chief trouble arises from his temperament or from the bad methods he has acquired.

On the other hand, there are undoubtedly cases in which pupils of excellent native ability are perverted by bad methods of instruction. It is hard to believe that the A-B-C method did not spoil many an excellent mind. There are methods of excessive phonic analysis and methods of oral reading in the upper grades even today which hold back pupils who would otherwise make great progress. After these retarding methods have been practiced for a time on pupils a type of mental lethargy results which simulates so closely native sluggishness of temperament that it is again quite impossible to tell whether the poor reading is the result of native or acquired traits.

PRACTICAL TREATMENT THE SAME WHATEVER THE SOURCE

However absorbing the distinction between native and acquired individual differences may be to the scientist, the practical school officer finds that he must make an assumption which brings methods of study into the foreground and pushes natural traits into the background. The facts can be expressed in several different ways. (1) The business of the school is to make the most out of a pupil with backward traits. It is the temper of present-day society that this pupil should be led, if possible, to use the best methods that he can acquire. The school should be especially alert to see that his backwardness does not lead him astray. (2) Even if the backward child cannot ultimately be normal, society wants the school to exhaust every possible effort to bring him to normality before giving up the effort. (3) Society today is optimistic and dictates that if our methods of teaching do not succeed in the lower grades there is ground for the hope that with increasing maturity will come an increased possibility of success. The experiment of training pupils must be tried, therefore, not only once but at recurring intervals. (4) Society believes that methods can con-

stantly be improved. It therefore dictates that attention be given to methods with all grades and kinds of pupils.

Put in broad terms, the argument is that whatever can be accomplished by improving methods is clear gain and the business of the schools is to assume, whether it is so or not, that method is at least 90 per cent of the practical problem. Native endowment is, indeed, present, but in some measure even native limitations can be corrected by improved methods.

Thus we are able to lay down the fundamental assumption on which such a chapter as this may proceed, namely, the assumption that the great individual differences in reading are due chiefly to acquired methods of attacking the printed page. The business of the school is to examine every case and ask what methods exhibited by a given individual are in need of correction and what methods should be conserved. To the teacher the pupil is a bundle of methods of work. Each method is potentially open to modification and can be improved if only the right procedure is adopted.

Let it be explicitly understood that it is frankly admitted that this assumption often leads to a waste in effort. Scientifically we know that some persons cannot be improved by instruction. Practically, too, we find it better to admit in some cases that it is useless to spend effort trying to improve methods of mental work. There are defectives who cannot be reached. But the cases discussed at length in Chapter VI show how difficult it is to dispose even of extreme cases on any assumption other than the assumption that what is needed is better methods.

With the distinctions and discussions above outlined in mind let us examine several typical cases in order to find out how far our scientific studies suggest possible remedies.

THE SLOW, OVERCAREFUL READER

First, let us take the case of a mature teacher who before training read understandingly but very slowly. He reported that his average rate of silent reading was 2.3 words per second, with a range from 1.9 to 3.2 words per second. The latter rate was reached in reading from a child's primer. He noted that he found

himself disposed to move his lips and say each word to himself. Any effort to speed up the operation brought confusion and inability to understand. He was an excellent oral reader, never missing a word and quite able to pick out the sounds of even an unfamiliar word.

The diagnosis of this case was facilitated by watching his eyes. It was observed that he made an excessive number of fixations during silent reading. The conclusion reached was that the case showed the results of excessive emphasis on oral reading.

Experiments were tried consisting of a conscious effort to suppress articulation, to see phrases, and to restrain movements of the eyes. After four weeks of daily practice with material that was easy and familiar the experimenter reported a subjective assurance that he had never felt before. It was found that he could read 4.7 and in some cases as many as 6.2 words per second. The eye-movements were irregular but were in some cases evidently longer than they had been.

This case is selected from a number of others of like type because it has been reported to the author of this report during several successive summers. The reader now has a consistently high rate of reading. The training evidently started an entirely new method of intellectual work.

THE RAPID READER WHO NEGLECTS DETAILS

The second case is of the type opposite to that described above. The subject finds that he can read familiar matter at a rate as high as eight words per second. Difficult matter involves more effort and reduces his rate to two or three words per second. His eye-movements in silent reading are long, often covering phrases. In oral reading his eye-movements are more numerous to the line than in the case of most adults and involve many regressive movements. This person is a poor oral reader. He is conscious of inability to sound new words such as proper names. In silent reading he sees only the length of the proper name and a few conspicuous letters; he never gets the details. He learned to read as a child without being taught—picked up reading, as it is said. He is a poor speller. He is quite irregular in his mistakes in spelling; this shows that he

does not have wrong associations between sounds and letters but is lacking in stable associations. In mature years this person substituted a knowledge of the derivation and structure of words for sound associations. As a result he has improved somewhat in spelling but is easily confused and is never quite sure that he is right. He finds that if he must read a passage out loud it is very desirable that he practice it.

This case is by no means as easy to attack in an experimental way as was the former. Nor is there as strong a motive. The defect in spelling is so far compensated for by the rapidity in reading that the person has drifted along and is likely to drift along in his fixed habits.

The case is significant for this report chiefly as a warning against the picking up of the reading habit by children. The danger is that the habits of seeing words and phrases will get established firmly and will include in some cases a sufficient vocabulary to remove all disposition to learn the details of word structure through phonic or letter analysis.

THE SLOW READER WHO COMPENSATES BY HARD WORK

A case was brought to the attention of the experimenters working on this investigation of a high-school girl who was getting on well in her school work but found it exceedingly difficult to keep up with her classes in home assignments. Reports from her various instructors brought out the following statements.

She is a very satisfactory student in French because she thinks clearly, studies thoroughly, and pronounces easily and correctly. The only drawback to her work is a lack of confidence in herself, which leads her to lose her head occasionally and feel that she knows much less than is the case. In English she is an appreciative and careful student, a little slow at times in getting a grasp of things. She has certainly no serious weakness up to this point and frequently offers hints of superior work. In mathematics she is in the better section and stands eighth among eighty-five students. In general science her work has been very satisfactory and her grades are high.

This girl is like many another student who is getting on all right so far as the school is concerned but is doing it at great expenditure of effort.

She was tested with a series of passages both in oral and silent reading. Table XXXIV gives the rate in words read per second in each passage. The passages used were different from one another and the testing took place on three successive days. The figures show that in general the rates of silent and oral reading are very much alike.

TABLE XXXIV

NUMBER OF WORDS READ PER SECOND BY THE HIGH-SCHOOL GIRL DESCRIBED IN THE TEXT

Oral Reading	Silent Reading
2.8	3.2
2.7	3.2
3.1	2.7
3.1	2.9
2.3	2.7
2.2	2.3
3.1	3.3
3.7	2.8
1.8	3.0

There were marked tendencies to whisper all material read. She was much surprised when told not to do this and was sure she would not understand what she read because, as she said, she understood what she read only when she "heard" the words.

There was no opportunity to verify the diagnosis of this case by a course of treatment, but it is evident that the girl had been trained with excessive emphasis on articulation. Her habits of visual fixation were doubtless slow and her span of recognition was short. She was probably old enough to have her difficulty described to her, although her timidity might have been unduly increased by so doing. In any case the general line of treatment is obvious. Vocalization should be overcome by attention to phrases and by a general speeding up of the reading process. Familiar passages read under pressure probably constitute the most available material for instruction.

THE CARELESS READER

A fourth case is that of a high-school student who seems to read rapidly but often fails to get the meaning of what he reads. He reads silently as many as 5.5 words per second. He reads apparently without vocalization but seems to skip words and certainly skips ideas. He is careless and uncertain.

The student reads orally fairly well but does not group phrases into significant sentences. He is not especially interested in his work and prepares his lessons very irregularly.

This case is more difficult to deal with than was the case last described. The training here should not emphasize the mechanical side of reading. The student does not need to be speeded up. The appeal in this case should be made to his interests. Probably his reading has grown irregular because the reading he has been required to do has not concerned itself with matters that fall within his intellectual insights and interests. This boy is a mere reader of words and sounds. He has mastered the technique of reading both orally and silently, but he does not make proper use of it.

The case is one for reference to those who teach him subject-matter. The teacher of reading has really very little to do with this case.

THE UPPER-GRADE PUPIL WHO IS FAILING

A perplexing type of case not uncommon in the upper grades includes pupils who have lost all interest in school work and yet are not in any sense of the word intellectual defectives. Sometimes it is said of these pupils that they are hand-minded and not able to think in theoretical ways.

A group of boys of this type, known as an industrial class, has been connected with the laboratory schools of the University of Chicago for some years past. These boys furnish some very significant symptoms appropriate to our discussion.

The progress in regular school work of the twenty members of one class is indicated in Table XXXV.

Special attention is called to the last column in Table XXXV. It seems not improbable that irregular schooling explains these

cases and not some mysterious native limitation described by the term "hand-mindedness."

TABLE XXXV

DESCRIPTION OF MEMBERS OF THE INDUSTRIAL CLASS*

Grade Last Attended in School	Number of Cases	Number not Promoted	Average Retardation in School	Average Number of Different Schools Attended
VIII.....	2	1	1.5	4.0
VII.....	6	6	2.1	2.3
VI.....	12	11	2.3	3.6

* Figures taken from tables prepared by R. M. Hogan.

This class was carefully tested by R. M. Hogan, who had them in charge. His results are presented in an unpublished thesis for the Master's degree. W. S. Gray's oral- and silent-reading tests were employed. The average scores of these boys in oral reading are given in Table XXXVI.

TABLE XXXVI

RESULTS OF THE ORAL-READING TESTS GIVEN TO THE BOYS OF THE INDUSTRIAL CLASS

Grade	Average Score	Mean Variation	Highest Score	Lowest Score	Number of Cases
VIII.....	.....	.....	55	46	2
VII.....	42.1	9.5	62	32	6
VI.....	42.8	11.3	62	22	12

The standard scores in oral reading for various grades as set by W. S. Gray as a result of numerous tests with normal classes are given in Table XXXVII. The figures here shown should be compared with the figures in the column marked "Average Score" in Table XXXVI.

TABLE XXXVII

W. S. GRAY'S STANDARD SCORES IN ORAL READING

Grade	Score
VIII	48
VII	47
VI	49

Gray's standards in silent reading are given in Table XXXVIII.

TABLE XXXVIII

STANDARDS GIVEN BY W. S. GRAY IN RATE AND QUALITY OF SILENT READING

Grade	Rate	Quality
VIII	3.21	48.2
VII	3.00	43.2
VI	2.79	39.0

The results for the industrial class in rate and quality of silent reading are given in Tables XXXIX and XL. The figures in the columns headed "Average Score" should be compared respectively with the columns in Table XXXVIII headed "Rate" and "Quality."

TABLE XXXIX

RATE OF SILENT READING OF THE BOYS IN THE INDUSTRIAL CLASS

Grade	Average Score	Mean Variation	Highest Score	Lowest Score	Number of Cases
VIII	.....	.....	3.44	2.21	2
VII	2.73	.51	3.44	1.90	6
VI	2.91	.89	5.00	1.62	12

TABLE XL

QUALITY OF SILENT READING OF THE BOYS IN THE INDUSTRIAL CLASS

Grade	Average Score	Mean Variation	Highest Score	Lowest Score	Number of Cases
VIII	.....	.....	60	43	2
VII	32.1	8.9	52	19	6
VI	20.0	9.8	47	0	12

These tables show that the boys are as a class poor readers. Some of them are very poor readers. The rate of silent reading is comparatively high, but when taken in connection with the quality score, which is very low, shows that the rapid rate is an indication of superficiality in reading rather than of superior ability.

The class is undoubtedly typical of a great number of pupils who go out of the elementary schools and do not carry with them any real equipment in the way of well-developed tastes and habits of

reading. In these cases, as was pointed out above, there is great irregularity in the schooling. Doubtless various teachers have used different methods in teaching reading, with the result that the members of the class have cultivated bad methods.

As a result of his study of these boys Hogan comes to the conclusion that they are individual cases which have become irregular because they did not fit into the graded scheme. Such a general statement requires an analysis which will ultimately make it possible to cope with these individual differences if the cases are to be dealt with adequately. The analysis here suggested is of the reading methods of such pupils.

It is, of course, a mere matter of guesswork at this stage to undertake to say what treatment would be of help. It is a fact that some of these boys were induced to take an interest in history and other subjects as a result of instruction in which emphasis was laid on content which would appeal to their practical interests. But it is quite as emphatically stated by their instructors that the boys were not interested in ordinary forms of instruction in reading. Appeal to general practical interests is perhaps a strong enough motive to make a boy read in spite of the obstacles set up by his poor methods of reading, but it is hardly to be hoped that these practical interests will improve his habits of reading unless some definite attack is made on the problem by a skilful teacher.

THE PUPIL IN THE LOWER GRADES WHO IS AN ACCOMPLISHED READER

From the difficult type of case described in the foregoing paragraphs let us turn to the opposite type of pupils. There are many pupils who are very forward in their reading. In the second and third grades they show a power of comprehension and a rate which compare with those of many an upper-grade pupil.

VARIATIONS AS SHOWN IN SURVEY RESULTS

The facts which will make this point clear are supplied by unpublished tables prepared by W. S. Gray in his study of Cleveland. Table XLI shows the distribution of 329 second-grade pupils in respect to quality and rate of silent reading. In the first

column on the left of this table are the various grades of quality. The pupil might have scored 100 points. As a matter of fact only three scored more than 60 and nine scored between 0 and 4, twenty-three scored between 5 and 9, and so on. The second column shows the number of pupils making each quality score. The astonishing fact is the wide range of abilities in the second grade. Ten pupils scored more than 55 points and less than 60; twelve scored between 50 and 54. The last three columns at the right of the table show the rate of reading exhibited by the various quality classes. The differences in rate are also very striking.

TABLE XLI

QUALITY AND RATE OF SILENT READING OF 329 SECOND-GRADE PUPILS IN THE CLEVELAND PUBLIC SCHOOLS

QUALITY SCORE	NUMBER OF PUPILS WITH FOREGOING SCORE	PERCENTAGE OF PUPILS WITH FOREGOING SCORE	RATE IN SECONDS PER 100 WORDS		
			Lowest	Highest	Median
0– 4.....	9	3	53	180	75
5– 9.....	23	7	20	133	46
10–14.....	29	9	20	240	62
15–19.....	50	15	20	200	58
20–24.....	46	14	12	470	54
25–29.....	39	12	18	135	45
30–34.....	34	10	20	130	60
35–39.....	29	9	8	115	45
40–44.....	27	8	12	125	37
45–49.....	18	5	15	72	30
50–54.....	12	4	27	275	46
55–59.....	10	3	17	85	36
60.....	3	1	25	26	26
Total....	329				

Fig. 4 shows in the full-drawn line the curve of distribution corresponding to the third column of Table XLI; Fig. 5 shows in the full-drawn line the curve corresponding to the last column.

Table XLII shows the quality and rate of silent reading of 322 pupils in the third grade. The broken lines in Figs. 4 and 5 show the facts for the third grade corresponding to those shown in the full-drawn lines for the second grade.

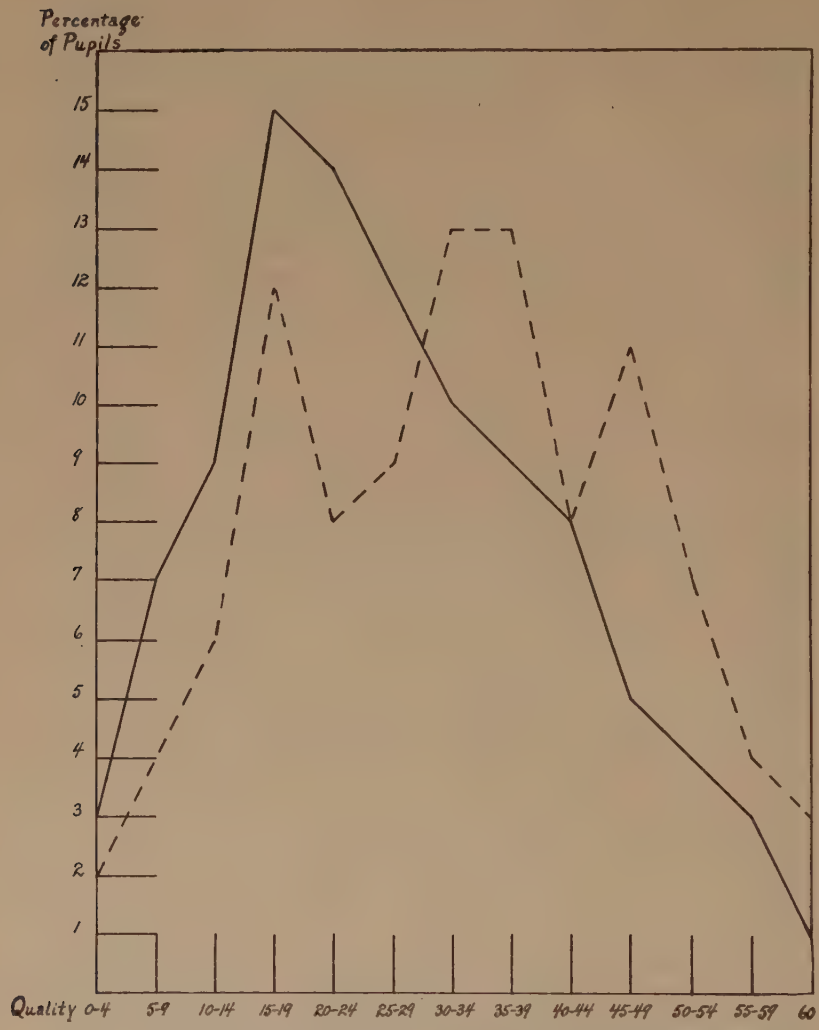


FIG. 4.—Distribution of 329 pupils in the second grade (full-drawn line) and 322 pupils in the third grade (broken line) of the Cleveland public schools in quality of silent reading. The percentage of correct answers is represented in the groups along the horizontal axis. The percentage of pupils in the grade scoring the various quality marks is represented in the vertical.

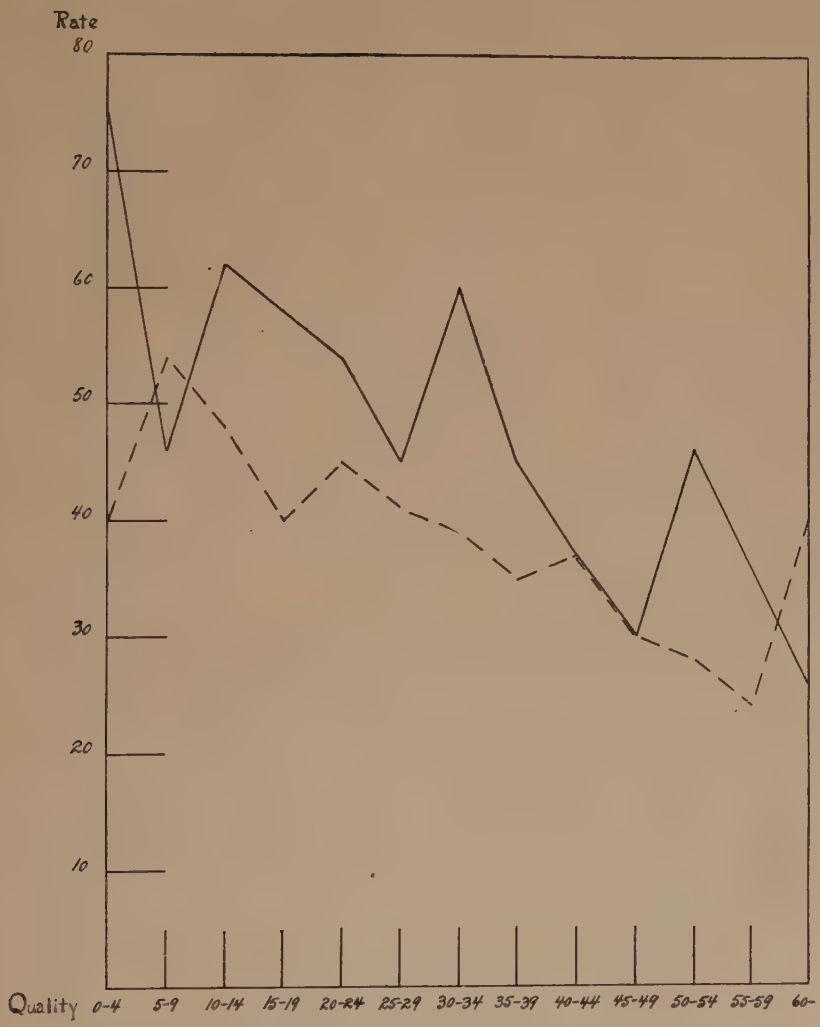


FIG. 5.—Number of seconds required to read 100 words by the median pupil in each of the quality groups represented in Fig. 4.

TABLE XLII

QUALITY AND RATE OF SILENT READING OF 322 THIRD-GRADE PUPILS IN THE CLEVELAND PUBLIC SCHOOLS

QUALITY SCORE	NUMBER OF PUPILS WITH FOREGOING SCORE	PERCENTAGE OF PUPILS WITH FOREGOING SCORE	RATE IN SECONDS PER 100 WORDS		
			Lowest	Highest	Median
0- 4	7	2	26	60	40
5- 9	12	4	17	170	54
10–14	18	6	13	147	48
15–19	39	12	16	100	40
20–24	27	8	17	95	45
25–29	30	9	16	107	41
30–34	42	13	18	140	39
35–39	41	13	15	100	35
40–44	25	8	20	75	37
45–49	36	11	16	68	30
50–54	22	7	13	90	28
55–59	13	4	16	80	24
60	10	3	22	67	40
Total	322				

HOW SHALL CLASS INSTRUCTION DEAL WITH THESE DIFFERENCES?

We come back at this point to the question propounded at the opening of the chapter. Is there any justification in holding together in a single class pupils as widely separated as are these in rate and quality of reading?

The answer to this question is suggested by the discussions of methods of reading which have filled this and preceding chapters. There are advantageous methods of attacking new words. Pupils at different levels of achievement can very properly be dealt with as a group for the purpose of imparting the universally useful methods of word analysis. It is the duty of the school to discover the common lessons of this type which should be given to the group. For example, phonic analysis in the primary grades and word and sentence analysis in the upper grades represent such steps in method.

Beyond this common body of instruction in method appropriate to all the members of the class there is a demand for a great deal of individual training which has usually been neglected in the

schools. Pupils who lag behind the class or who do not take on correct methods rapidly should be watched and given special help. Forward pupils should be encouraged by every possible device to work by themselves.

CHANGES IN THE SCHOOL PROGRAM

The practical school program would undergo a change if these suggestions were adopted. Fifth-grade reading, for example, would no longer consist of an oral exercise in which each pupil holds his book and waits for an opportunity to read a sentence in his turn. This class would devote three-fifths of its time each week to silent reading under supervision. This supervision would be so organized that the teacher would select the backward pupils and give them one type of instruction, consisting probably in phonic analysis. The forward group would be encouraged to read much. This rapid group would also be given instruction in spelling.

The teacher who thus has several different kinds of reading exercises under way will be led to make an analysis of each pupil and will soon cultivate a true understanding of the meaning both of class organization and of individual variation from the average.

WHAT TYPE OF INSTRUCTION IS NEEDED IN THE UPPER GRADES?

In the grades beyond the fifth reading should take on individual character in increasing degree but should be standardized by a careful comparison of results.

Facts parallel to those presented for the second and third grades are given in Tables XLIII and XLIV and Figs. 6 and 7 for the seventh and eighth grades. The full-drawn lines in the figures represent the seventh grade; the broken lines, the eighth grade.

UPPER GRADES MORE HOMOGENEOUS, ESPECIALLY ON SIDE OF MECHANICS OF READING

A study of the four tables and figures brings out two important conclusions. First, the range of differences in rate in the upper grades is small. This means that in the sheer mechanics of reading the seventh and eighth grades are fairly homogeneous. The

TABLE XLIII

QUALITY AND RATE OF SILENT READING OF 228 SEVENTH-GRADE PUPILS IN THE CLEVELAND PUBLIC SCHOOLS

QUALITY SCORE	NUMBER OF PUPILS WITH FOREGOING SCORE	PERCENTAGE OF PUPILS WITH FOREGOING SCORE	RATE IN SECONDS PER 100 WORDS		
			Lowest	Highest	Median
0– 4.....	13	6	26	82	43
5– 9.....	32	14	25	72	35
10–14.....	40	18	20	85	37
15–19.....	31	14	20	67	35
20–24.....	30	13	19	76	32
25–29.....	22	10	15	60	32
30–34.....	19	8	22	72	27
35–39.....	20	9	16	85	30
40–44.....	10	4	16	52	28
45–49.....	3	1	30	37	35
50–54.....	5	2	20	43	30
55–59.....	0	0	.....	.....	.....
60.....	3	1	34	52	35
Total....	228				

TABLE XLIV

QUALITY AND RATE OF SILENT READING OF 193 EIGHTH-GRADE PUPILS IN THE CLEVELAND PUBLIC SCHOOLS

QUALITY SCORE	NUMBER OF PUPILS WITH FOREGOING SCORE	PERCENTAGE F PUPILS WITH FOREGOING SCORE	RATE IN SECONDS PER 100 WORDS		
			Lowest	Highest	Median
0– 4.....	3	2	29	32	30
5– 9.....	13	7	17	77	32
10–14.....	21	11	20	65	36
15–19.....	34	18	15	72	33
20–24.....	26	13	20	65	32
25–29.....	21	11	17	72	31
30–34.....	24	12	15	53	30
35–39.....	16	8	17	52	31
40–44.....	13	7	19	57	31
45–49.....	5	3	20	40	36
50–54.....	6	3	25	41	33
55–59.....	7	4	22	44	29
60.....	4	2	22	61	30
Total....	193				

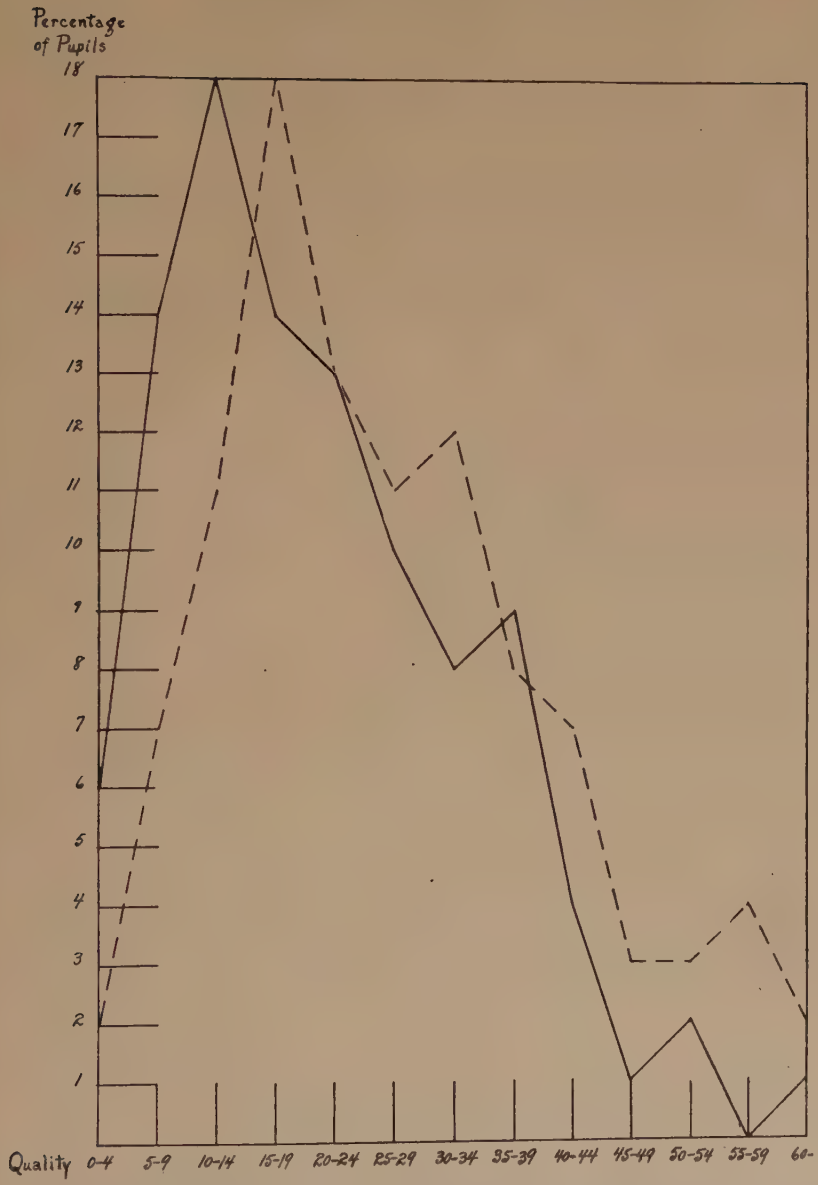


FIG. 6.—Distribution of 228 pupils in the seventh grade (full-drawn line) and 193 pupils in the eighth grade (broken line) of the Cleveland public schools in quality of silent reading. The percentage of correct answers is represented in the groups along the horizontal axis. The percentage of pupils in the grade scoring the various quality marks is represented in the vertical.

homogeneity here shown has, indeed, been secured in large measure by eliminating pupils who could not keep up with the grade, but it has been produced, undoubtedly, in some degree by instruction in the school.

Secondly, the widest divergence is in quality rather than in rate of reading. The height of the quality curves for the seventh and

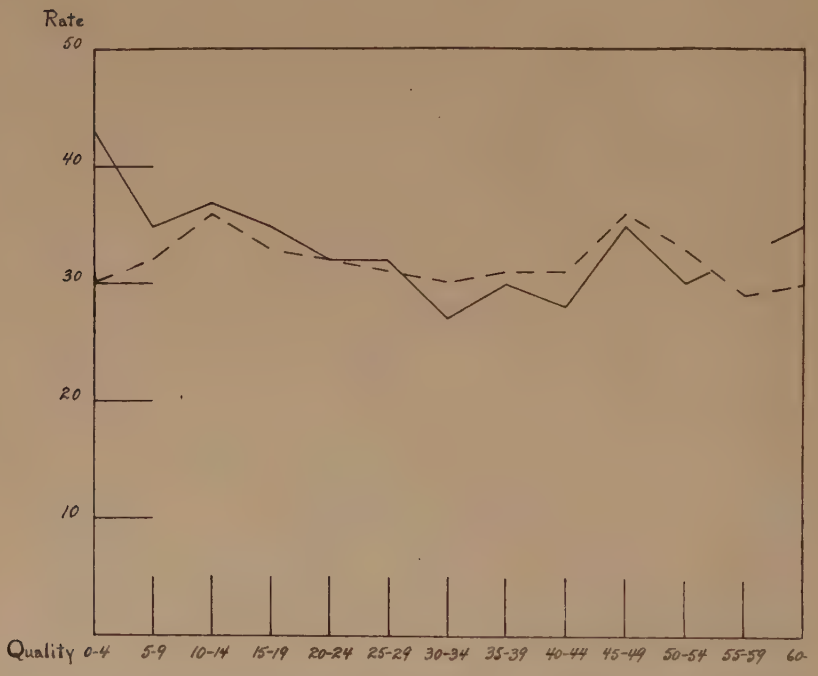


FIG. 7.—Number of seconds required to read 100 words by the median pupil in each of the quality groups represented in Fig. 6.

eighth grades at their modal points is greater than the height of the modal points of the curves for the second and third grades. This shows that the pupils in the seventh and eighth grades are more nearly alike in quality of silent reading than are the pupils in the lower grades. The scores of the majority are poor. The fact that the quality scores are comparatively low for the majority of pupils indicates the direction in which effort must be expended.

NEED OF ANALYTICAL STUDY OF CASES

Here again cases must be analyzed if teachers are to be properly guided in their work. Inability to get meaning is due in some cases to defects on the purely mechanical side. That there is need of mechanical drill in some cases in the upper grades is not denied. But in most cases inability to get meaning is due to lack of training in interpretation, and this is a matter quite different from the mechanics of reading. The teacher must be ready to analyze the situation and fit instruction to individual needs.

ANALYSIS IN SCHOOL WORK

The purposes of this chapter have been served if it has been shown that analysis is the common task of the student of the science of education and of the practical school officer. There are vast individual differences in pupils. There is also the practical necessity of dealing with pupils in groups. The problem is how to recognize individual needs and at the same time economize effort by working with groups. The solution of this problem will be found only when analysis of the process which is being taught reveals those aspects which are common to all the members of the class and those which must be dealt with individually. When analysis has brought out these distinctions it is the duty of the school to so organize its instruction as to provide for both class instruction and individual instruction. There can be little doubt that teaching in groups has been overdone. Individual instruction based on analysis of individual performances is called for as one of the most important innovations to be worked out in the schools. Individual instruction, when it is properly worked out, will not be a chance concession to personal caprice but a systematic analysis of individual performances followed by an adaptation of instruction to individual levels of achievement.

SUMMARY

This chapter may be summarized in the following statements:

There are great individual differences in methods of reading and in success in getting meanings from passages.

These differences have various origins, some of them obscure and impossible of determination in the case of an advanced pupil.

The duty of the teacher is to diagnose the individual case as though it were a matter of method of work, ignoring the remoter causes which are part of the individual's inherited temperament.

When the pupil's method of work is understood through analysis an attempt should be made to bring that method into a more efficient form. The more efficient form will in turn be known through analysis of successful readers.

Analysis does not require the minute scientific testing of every case. Such scientific testing is desirable wherever possible. But the most direct applications of laboratory investigations of reading are to be found in the suggestions which they yield as to the probable character of miscellaneous cases which cannot readily be subjected to scientific study.

Such analysis of cases as has been suggested will undoubtedly lead to changes in school practices. The results of such changes in school practices will serve as true scientific checks on the theories developed in the effort to apply laboratory results.

Changes in school practice will follow different lines in view of differing needs. Especially will different grades emphasize different modes of instruction, as was shown also in the last chapter. The lower grades will of necessity give more attention to the mechanics of reading. The upper grades will attend more to the cultivation of powers of interpretation.

This final conclusion opens the way for the last chapter, which deals with the problem of the nature of interpretation.

CHAPTER IX

READING FOR MEANING

There is danger that this report will be misleading because it has given great emphasis to what may be called the mechanical side of reading. It is true that most of our discussions have dealt with fixation pauses, units of articulation, and the other purely formal aspects of reading. It is well, therefore, that the relation of the mechanics of reading to the interpretation side of the process be made a subject of explicit discussion.

LABORATORY INVESTIGATIONS MUST DEAL WITH RECORDS

In opening the discussion it may be well to point out why this report has dealt at such length with the mechanical side of the reading process. Experimental investigations must of necessity deal with the tangible aspects of the process. When the eye fixates a word there is a possibility of securing a record. When the organs of articulation react there is a definite sign of inner processes. All our records and measurements deal with these and like objective aspects of reading.

INTERPRETATIONS SHOULD NOT BE IGNORED

The school is compelled, as is the experimental scientist, to give a great deal of attention to the externals of the reading process. Not infrequently the school becomes so absorbed in the externals that it forgets the true end and aim of all instruction in reading, which is the cultivation of the power of interpretation. It behooves the scientist and the teacher, therefore, to try to get behind the mechanical processes and understand the less tangible aspects of reading.

SUBDIVISION OF GENERAL PROBLEM

The general problem which thus confronts us divides at once into three minor problems. (1) What is the nature of interpretation or of the recognition of meanings? (2) What are the successive stages in the recognition of meanings which appear as the pupil

progresses through the grades? (3) What is the relation of interpretation to the various methods of reading, that is, to the mechanical processes which have been described in detail in this report?

PSYCHOLOGY OF MEANINGS

In dealing with the first of these problems we are fortunate in having a very complete psychology of the mental processes involved in the interpretation of words. The most general statement which can be made and one which will certainly not be challenged by anyone is that the interpretation of a word or phrase depends on the presence of associated experiences in the mind of the reader. The prime requisite, therefore, in learning to read is that the pupil possess personal experiences other than those of the words themselves.

In this connection it is well to point out one fallacy which has sometimes been committed. It has been said that a word which does not call up some past experience is an utterly barren item in the pupil's mental life. The truth is that many words when first heard do not arouse interpretative experiences. It is enough in these cases if the word becomes a motive for seeking an idea. If the pupil is aroused by a word to look for further experiences to attach to it, then the word which is at first without meaning may be a very potent instrument of instruction. Our principle should, therefore, be formulated in some such way as this: A word must ultimately be connected with some other experience in order that it may be interpreted, but the word may, and often does, furnish the motive for seeking the interpreting experience.

Our attention is turned from the experience of the word itself to that phase of experience which we have called interpreting meaning. The psychology of a generation ago had a very simple formula for the description of this interpreting experience. It conceived of the mind as full of images or pictures of external objects and events.

MEANINGS ARISE OUT OF REACTIONS

The recent developments of psychology have established a much more fruitful doctrine. The mind is not a mere storehouse of memory images; it is an active organized personality responding with reactions to the excitations from the outer world. When I

see food I do not merely receive in the mind an impression or call up memory images; I am aroused to a form of vivid desire and vigorous reaction. My experience corresponds to the tendencies toward reaction which are aroused in me more than to the image which I have in mind. Indeed, I may not look at the food in a way to see it in very great detail; I may be vague about what it is that appeals to my hunger, and yet I may have a very vivid consciousness of desire corresponding to the fact that I eagerly reach for the food. Thus with many of our experiences, especially those which have to do with our most urgent and fundamental needs, there is little emphasis on the picture in the mind and great emphasis on our reactions.

The most common and vivid experiences in life come from our own attitudes toward things. Seldom, indeed, do we analyze and scrutinize in detail the things about us. Analysis of a situation is itself evidence that we have reached an advanced stage of mental development. The scientist analyzes where primitive man is afraid or filled with the desire of possession. The primitive attitudes of fear and desire are the common interpreting experiences attached to objects. For example, the ordinary person recoils from a worm or from a strange object in the dark. The child is afraid of a dragon fly and has a mysterious dread of a bat. These vivid, personal attitudes are carried over to words. When one hears the word "worm" one has something like the vivid feeling of recoil that is experienced in the presence of the worm itself. It is not necessary to assume that one calls to mind a picture of a worm in order to have this interpreting recoil. The picture would often be a real distraction. The mind is aroused by the word to react directly and without delay in the dynamic way in which it would respond to the object itself.

Without attempting to pursue this matter further it becomes evident that in learning to read the child must ultimately connect with the printed word the forms of interpreting reaction which will make the printed words centers of vivid personal attitudes. The word "short" must give one the experience of contraction, while the word "long" is interpreted by an expanding attitude sharply contrasted with that aroused by the word "short."

So subtle are the meanings of some words that it is difficult to explain just what one has in experience. When I describe an act as beneath contempt my experience is full of vivid attitudes which can in no sense be described as made of up memory images.

Some words are never capable of interpretation except as parts of phrases. The word "on" is an example of such a relational word. Other words of the same type are "therefore," "accordingly," such comparative words as "more" and "less," and such defining words as "strictly" and "precisely." All of these words are vague or lacking in interpretative imagery but are vivid in that type of association which can be described by the term "mental attitude."

WHY TEACHERS USE PICTURES

When a teacher tries to marshal experiences which will attach meaning to words the process is in danger of being misunderstood. For example, the teacher holds a picture of a dog before the class and writes the word "dog" on the board. The observer may think that the picture is held up for the purpose of stamping an image on the mind. Not at all. The picture of the dog arouses all the child's vivid interest in and personal reactions to the animal. Then when the word is put on the board the whole experience with its reactions of pleasure goes over to the written symbol and the word "dog" becomes a center of direct living interest and interpretation.

MEANING DERIVED FROM SPOKEN WORD

Again, since the spoken word "dog" has all the rich associations of childish reactions the teacher may without using a picture write the word on the board and at the same time pronounce the sounds. Is this for the sake of producing in the pupils a mere reaction of pronunciation? Certainly not. The written word is to stand in the place of the spoken word and is to carry all the personal reactions which give real character and meaning to the earlier oral word.

INTERPRETATION IS A MATTER OF PERSONAL ATTITUDES

Whether the teacher uses the picture or the spoken word, the real purpose of the exercise is to attach to the printed word an interpreting attitude. The more vivid the experience used the

more vivid will be the reaction and the more complete the interpretation attached to the printed word. It is well, therefore, that a teacher should use pictures and objects. But in trying to understand what goes on in the pupil's experience the teacher should understand that the concrete object is itself a subject of interpretation through the reactions which attach to it.

The statements made above are strikingly confirmed by the fact that in speech and writing we constantly use figures of speech which are devices for carrying over attitudes rather than pictures. Thus if a person says that he has passed through a bitter experience he really means that he has experienced the same unpleasant recoil which he feels when he gets a bitter taste in his mouth. Bitter here means an attitude, not a taste.

PROGRESSIVE DEVELOPMENT OF INTERPRETATION

With the general definition of what constitutes meaning we turn to the second problem mentioned in the introductory paragraph. How should the school deal with meanings in different grades? Broadly speaking, the early grades are devoted to attaching meanings to printed words while the later grades are devoted to deriving meanings from the printed page.

EARLY READING ATTACHES MEANINGS TO WORDS

It is not possible for the pupil just beginning to read to derive new meanings from printed words or even to get many recombinations of ideas through the use of words. His problem is to attach meanings to the words. Hence the reading matter of the early grades should deal with experiences familiar to pupils. The words and phrases should be such that pupils will be able to attach quickly vivid personal reactions to words. The gravest danger at this stage of development is that strange words and combinations will be used and the child, having no vivid personal reaction at hand for real interpretation, will be content with the reaction of articulation. A kind of false interpretation will thus be set up in his experience.

Too much emphasis cannot be laid on the demand that early reading be in familiar fields of common experience. The experiences

may be those which attach to folk stories, or to the child's personal activities, such as running and jumping, or the familiar pictures of objects and animals about the house and yard. Anything that is familiar enough to arouse vivid reactions will serve, but it must be familiar.

Furthermore, it is well if the experience is highly charged with interest. Children can learn to read through contact with the duller objects of the familiar environment. One can read about cats and balls and chairs. But the newer readers show unmistakably that primary teachers are beginning to show a decided preference for stories of the little red hen and the three bears. The more vivid the interest the more interpretation, that is, the more personal attitude there will be to carry over and attach to the printed word.

IN HIGHER GRADES READING EXTRACTS MEANINGS

After one has learned the art of interpreting printed words through the association of these words with earlier experiences the process can be largely reversed. The older pupil who has a stock of interpretations can understand the book which combines and recombines ideas and builds up wholly new complexes. The process of interpretation is now one of extracting ideas from the printed page. Thus one reads in the geography of a land which is always covered with ice. The word "ice" is familiar and the word "always" has also acquired definite meaning. Put the two ideas together and the pupil is carried into a world which is unknown but capable of being understood through the ideas acquired in everyday life and in the earlier grades.

TIME AND CONSTANT REFERENCE TO THE CONCRETE NECESSARY IN LEARNING TO READ

The real processes in reading are thus seen to be those which go on in the mind back of the eye-movements and fixations. The combinations of ideas and the reorganization of these combinations are the processes with which the teacher is concerned.

The practical teacher knows, however, that two fundamental facts must be kept in mind all the time one is trying to make

intelligent readers out of pupils. (1) The setting up of ideas and preparing for later reorganizations require time and effort. Whoever thinks that reading is a natural art picked up in a day is sure to discover his mistake if he puts his theory to the test of practical school application. (2) The cultivation of the complete power of getting meanings is possible only after many returns to the concrete examples which give content to words.

CONCRETE IDEAS NEEDED EVEN IN UPPER GRADES

With these facts in mind the teacher will have pupils read much. At first the material will be simple and familiar. Later the material will be less familiar and more exacting, but it will be interspersed from time to time with references to concrete matters. Reading will thus become a part of the problem of the teachers of geography and nature-study. These teachers will not make the mistake, if they understand the nature of reading, of believing that the pupil will read all the facts of geography out of his textbook. Some of the facts of geography must be read into the book through contact with the products of countries and through observation of land forms. Reading should be enriched by concrete experiences, and concrete experiences should be classified and explained through reading.

SHIFT OF ATTENTION FROM MECHANICS TO INTERPRETATION

The change in the character of the reading matter which has been sketched in the foregoing paragraphs is intimately related to a shift in emphasis from the mechanical side of reading to the interpretative side. In the early grades the mind of the pupil is largely absorbed in seeing words and in attaching meanings to them. In the later grades the process of seeing words is so perfected that attention is freed to concentrate on interpretation.

The probability is very great that the mechanical requirements are mastered by many pupils very much faster than is ordinarily assumed. It is probably not necessary to do more than set a pupil on the right track and then supply him with material appropriate to his interest. He will acquire the higher technique of reading through much reading. The present practice of continuing drill

in the mechanics of reading throughout the elementary school undoubtedly retards pupils rather than helps them.

OVEREMPHASIS IN SCHOOLS ON THE MECHANICS OF READING

Many a pupil leaves school equipped with the mechanical ability to read words but utterly unacquainted with the possibility of interpretation. School reading has been a formal ceremony for the pupil. He has formed the habit of thinking that words have been adequately dealt with when they have been sounded. The fault is with the school's selection of reading matter and with the school's emphasis on mere mechanical perfection in oral reading.

FORMALISM DUE TO OVEREMPHASIS ON ADULT INTERESTS

The time will come when the reading matter will not be of the formal type now common in schools. The reading matter in the lower grades will be so selected as to induct the pupil gradually into the intricacies of the interpretative process. Emphasis on interpretation will be so graded as to use the pupil's power as fast as it is cultivated. Put in terms of particular grades, this means that for the first three years the pupil will read stories and familiar matter made up of phonetically simple words. Concrete material dealing with new but definite experiences will be presented in the fourth, fifth, and sixth grades. Reading matter for these grades should appeal to concrete interests and should stimulate the more intelligent approach to new ideas in books. Reading selections should be drawn from science as well as from literary classics. At the present time there is overemphasis on mature adult literary interests, and consequently reading becomes formal and lacks contact with real life.

This plea will be regarded by some people as a crass attack on the classical literature of our language. It is not. If one would have pupils read literature the worst possible mistake is to force them at too early a period to read anything that is abstract. Reading must be developed by the expenditure of much time and effort. Subject-matter must be vivid and concrete in the middle grades if words are to have meaning and if reading is to be more than a formal process.

LATER GRADES HAVE TO DO WITH INDIVIDUAL INTERESTS

The pupil who has had much reading up to the sixth grade and has all along been kept in contact with meanings, first by the selection of familiar matter and afterward by the selection of vivid concrete material, will arrive at the beginning of the adolescent period with a mastery of the technique of reading and with an interest in interpretation which may safely be relied on to guide him through the more intricate problems of reading in the upper grades and high school.

It appears in all aspects of school organization that the upper grades, more than the lower and middle grades, have to do with individual tastes and individual specialization. A continual check should be kept on the pupil's reading in these grades to make sure that meaning is being gained from the matter read and that improvement in rate and fluency is constant. But the problem here should no longer be one of detailed instruction in technique or of close adherence to those words which can be illustrated in the concrete.

MECHANICAL SIDE OF THE READING PROCESS

The third problem mentioned at the beginning of this chapter has been in some measure dealt with in the discussions taken up in the last paragraphs. This problem, it will be remembered, is, How is acquisition of meaning related to the mechanics of reading?

MECHANICS SHOULD BE MASTERED EARLY

The answer to the question is this. Under ideal conditions the mechanics of reading are disposed of very early and the pupil is encouraged to improve in speed and accuracy by the natural incentives growing out of his desire to get meanings more readily from the books with which he comes in contact. There ought to be no serious problem of mechanics in the upper grades and at the same time there ought to be continuous improvement. The unit of recognition should continually be enlarged.

Unfortunately these ideal conditions do not always exist. As has been shown in earlier chapters, many readers are so clumsy in their reading methods that they are continually distracting

themselves and losing the meaning of passages in the sheer effort to get the words. The middle grades are full of readers who cannot devote their attention to interpretation because they are tangled up in the process of seeing the words.

Like every other failure the failure to dispose of mechanics when they should be disposed of is expensive. How expensive the failure is can hardly be estimated until one begins to think of the pupils who leave school unaware of the value of the art of reading and of the pupils who fall behind in their studies because they cannot read.

AMERICAN SCHOOLS EMPHASIZE READING

Perhaps the most impressive way of bringing out the importance of successful training in reading is to point out the fact that the American educational system is essentially a reading system. The schools of this country depend on textbooks to an extent equaled nowhere else in the world. In European schools the instruction is oral, the teacher delivering the information to the class. By contrast our schools are almost entirely dependent on reading.

Historically the European method of instruction is a survival of the practices of the cloister schools and the catechism schools where the teacher gave the truth by oral instruction, and the truth was heard and accepted. The American school grew out of the demand of the Puritans for such training of each individual that he should be able without an intervening interpreter to read the Scriptures for himself. The religious motive of instruction has expanded into a broader view of what the schools should undertake, but the methods have continued into these later days. The oral method is characteristic of the European schools; the textbook method is characteristic of our schools.

INTENSIVE USE OF TEXTBOOKS IN MIDDLE GRADES

What is implied in the fact that geography, textbook arithmetic, and other reading subjects begin in the fourth grade? What is implied in the rapid multiplication in the fifth and sixth grades of textbook demands on the pupils? The answer to these questions is that the whole school organization is based on the assumption

that by the time pupils reach the fourth grade they have learned to read well enough to take in new meanings from the printed page.

It is a cardinal mistake to separate reading from the rest of instruction in the fourth and upper grades. Below the fourth grade reading may very properly be looked on as a separate subject because the pupil is being inducted into the difficult art of seeing and recognizing words. After the fourth grade the school assumes that a pupil can use a textbook and get his lessons out of the book.

EUROPEANS READ LESS COMMONLY THAN AMERICANS

The European child does very little reading in the upper grades. He is asked to cultivate the power of listening well, and he trains his powers of oral expression. But he never uses reading matter as familiarly as the great majority of American children do. The demand in the upper grades of American schools for much reading can be met only by completing the essential drill in mechanics before the fourth grade. Cases of difficulty after that period must be thought of as cases in which the school has not accomplished its results on schedule time.

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